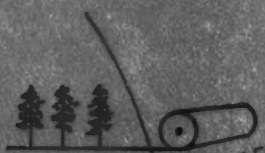
FEBRUARY 1960

The Paper Industry

Our best wishes for a successful Paper Week — where new information and new contacts may result in a productive change in your thinking.



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TECHNOLOGY DEPARTMENT

- *matching drive and load characteristics*
- *remoistenable adhesives*
- *quality control in felt manufacture*
- *use of pipe, fittings, valves and pumps*

Publishers of Paper and Pulp Mill Catalogue

...the first name in dryer felts

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The Paper Industry

Technology • Engineering • Management • Production

VOLUME 41 **NUMBER 11** **FEBRUARY 1960**

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From our point of view..

Can we compete peacefully?

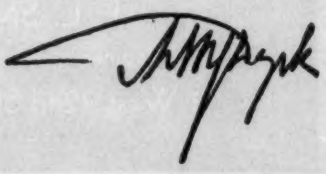
Now that we have been introduced to the new concept of peaceful competition — a concept first attributed to Krushchev and also adopted by R. M. Fowler as a topic of his Luncheon Address at the Canadian Pulp and Paper Association's annual meeting — we sincerely hope that all future competition in all areas of human endeavor, including that of the publishing field, may be conducted peacefully.

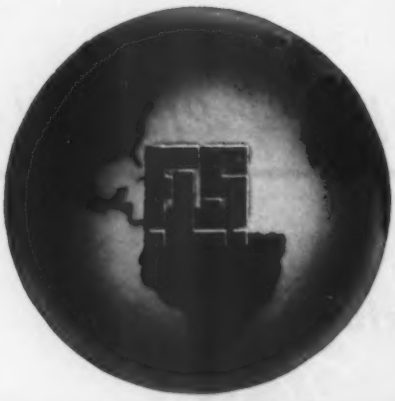
Neither Mr. Krushchev nor Mr. Fowler have given us a clear definition of the term "peaceful competition" or an indication of the impact such competition would have on both the national and business structures of our civilization. However, from all that was said, it is clear that the concept differs from that of "peaceful coexistence" by its dynamic quality. To compete peacefully implies action as opposed to the state of static isolation one would associate with peaceful coexistence.

We shall probably hear a great deal about peaceful competition in the course of the next decade. It may be a worthwhile project to consider seriously and to put to a test. We may find that, contrary to the objective of the conventional form of competition which tends toward the weakening or sometimes complete elimination of one of the competitors, peaceful competition could act as a sufficiently strong catalyst to energize both competitors to their highest levels of performance and with mutually beneficial results. We have seen many strange developments in the 20th century, with many well established concepts shattered and replaced by new ones — in many cases more revolutionary than that of peaceful competition.

While the term is new, peaceful competition — whether or not we are consciously aware of it — is being practiced in a democratic society. There are many businesses and many industrial establishments that seem to follow this concept in some form. And there is no doubt that peaceful competition is in operation at such events as the annual meetings of the APPA, TAPPI, CPPA and PIMA where, despite the keen competition that exists between the representatives of various industrial establishments, there still is a full interchange of ideas and a sharing of new thinking that can only be mutually beneficial to all participants.

However, whether we choose to compete peacefully or in open and destructive rivalry, the best possible and well-proved equipment we recommend in this struggle is the acquisition of maximum information and new knowledge. It remains a historical fact that the successful competitor has always been the one who is well equipped with these essential advantages.





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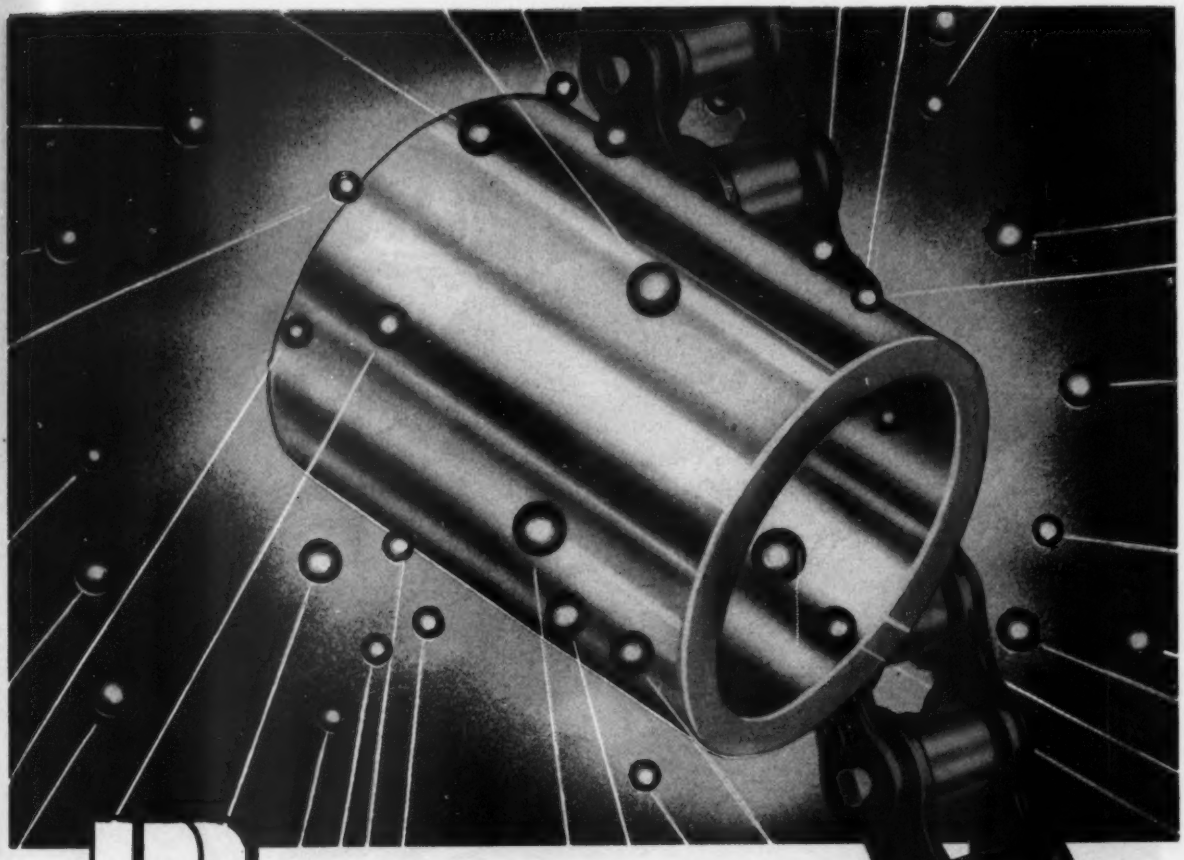

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fortified against fatigue

Shot-peening "cold-works" extra fatigue life into LINK-BELT roller chain

Shot-peening gives rollers of Link-Belt precision steel roller chain exceptional strength and stamina. And after shot-peening, they are burnished rather than ground or sanded. This achieves a SILVER-BRITE finish—and more important, *retains the fatigue resistant qualities of shot-peening.*

Other long-life "extras" of Link-Belt roller chain include: close heat-treat control, lock-type bushings, pre-stressing, pitch-hole preparation. For details, see Book 2657.

LONG LIFE AHEAD! Rollers for Link-Belt precision steel roller chain tumble out of shot-peening machine after being cold-worked to withstand punishment of today's high-speeds and heavy loads.

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ROLLER CHAINS AND SPROCKETS

LINK-BELT COMPANY: Executive Offices, Prudential Plaza, Chicago 1. To Serve Industry There Are Link-Belt Plants, Warehouses, District Sales Offices and Stock Carrying Distributors in All Principal Cities. Export Office, New York 7; Australia, Marrickville (Sydney); Brazil, Sao Paulo; Canada, Scarboro (Toronto 13); South Africa, Springs. Representatives Throughout the World. 15,081

BOOK 2657 has 154 pages of roller chain data. For your copy, contact your nearest Link-Belt office or authorized stock-carrying distributor. (See CHAINS in the yellow pages of your phone book.)

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OFF AGAIN ON AGAIN SAVE AGAIN

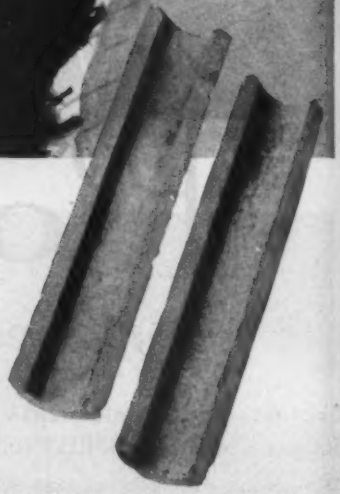
with Unibestos reusable pipe insulation

Why is Unibestos worth more at competitive prices than other insulations? One California refinery required removal and replacement of Unibestos insulation from a 24-inch line TWICE A MONTH FOR FIVE YEARS! Naturally, these people now use Unibestos exclusively.

Everywhere . . . in refineries, power plants, process industries . . . once Unibestos is put to work, we have a steady customer. All we ask is a chance to show *you* how Unibestos can be constantly and effectively reused; how it resists impact and rough handling; eliminates shrinkage; defies thermal shock, fumes, acids and moisture; cuts application time and costs; and guarantees real insulating efficiency. Only Unibestos is made from the exceptionally long fibers of tough ***Amosite*** asbestos.

Available in full range of standard pipe sizes and in block form. Single thickness to five inches. Specials to 44" O.D.

Write today, on your letterhead, for Bulletin No. 65610.



UNIBESTOS AFTER 25 REUSES

Unretouched photograph of typical sections of Unibestos pipe insulation after 25 reuses. Rugged qualities of Unibestos make reuse on changed lines or test lines standard operating procedure under all types of conditions.

UNIBESTOS

worth more, yet sold at competitive prices

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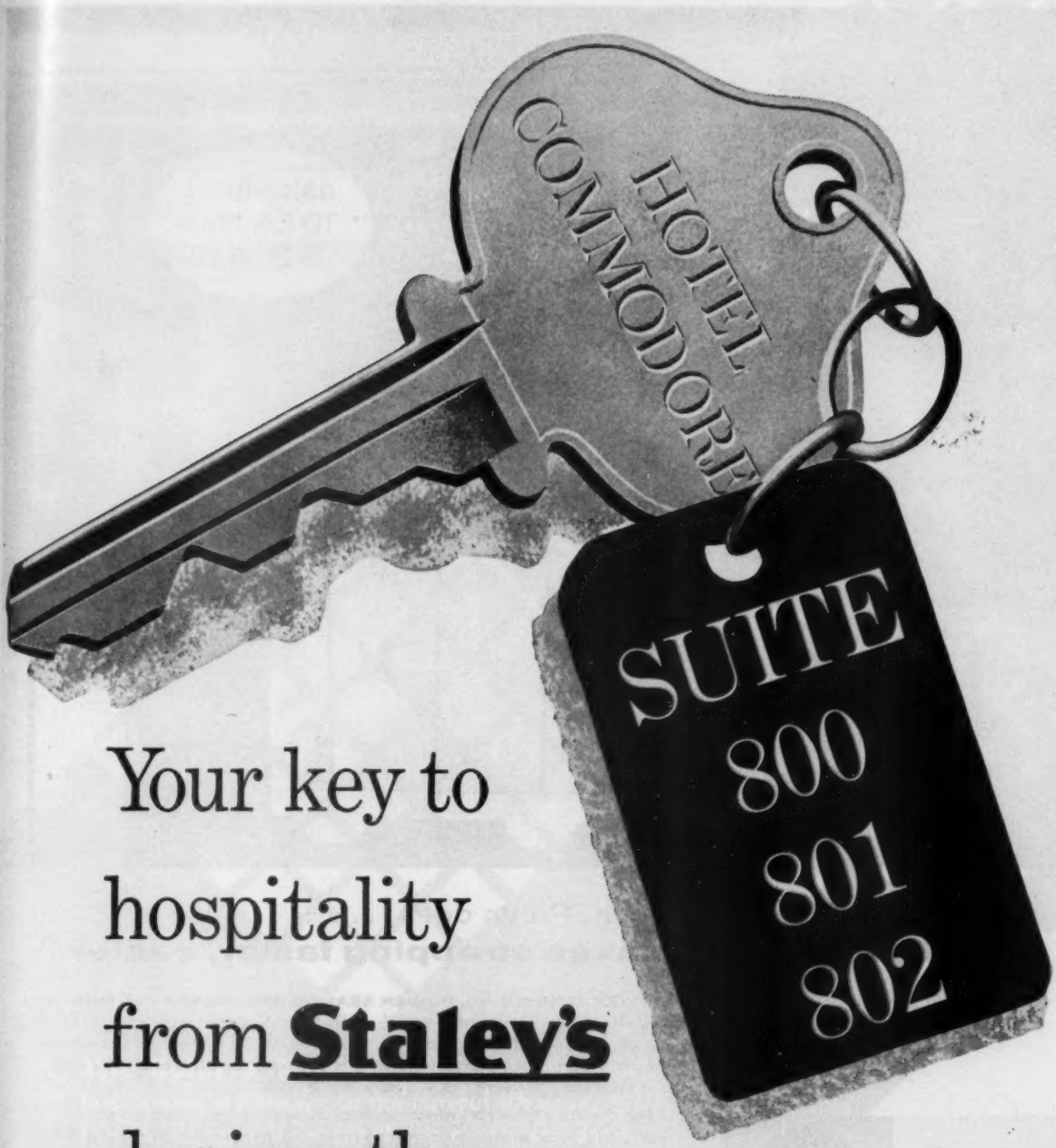

Your key to hospitality from **Staley's** during the Annual TAPPI Meeting

A. E. Staley Mfg. Co., Decatur, Ill.

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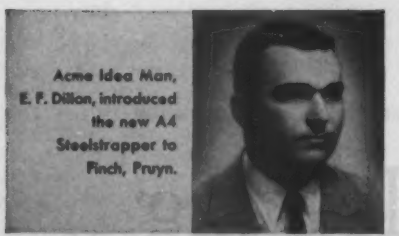
Check your *AIM . . . Finch, Pruyn does . . .

Full-power tool makes strapping faster, easier

POWER TENSIONING, POWER SEALING AND POWER CUTTING; now it's all done with the new A4, the first fully powered steel strapping tool! Finch, Pruyn and Company, Inc., Glens Falls, New York, manufacturers of printing and converting papers, is proving the advantages of the A4 Steelstrapper every day. (Idea No. S3-46)



Acme Idea Man, E. F. Dillon, introduced the new A4 Steelstrapper to Finch, Pruyn.

Both the A4 and a reel of Acme Steel Strapping are mounted on a traveling hoist that can be moved over any part of the strapping floor . . . nothing to carry; nothing to cart around. The A4 is easily operated on top of high skids and in other difficult-to-reach places. It can be used on small flat surfaces because of its short strap base.

One hand operates the A4. The operator presses one control and strap is air-power tightened to a pre-determined tension. He presses another on the same handle, and magazine-fed seals are crimped and the strapping is cut . . . without waste, without effort!

***Check your Acme Idea Man** for a demonstration of the new A4 and full information on various overhead mounting systems. Call the nearest Acme Steel Company office or write: Dept. PKS-20, Acme Steel Products Division, Acme Steel Company, Chicago 27, Ill. In Canada, Acme Steel Company of Canada, Ltd., 743 Warden Ave., Toronto 13, Ontario.

ACME STEEL **STEEL STRAPPING**

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DYES AND DOLLARS

The Color of Money. Paper mills, like other businesses, are always on the lookout for ways to save money without sacrificing quality standards. In the past year CIBA Company Inc. has introduced "Paper-Proved" Dyes aimed at doing just this. Among these are: Direct Yellow P-CD, Direct Yellow P-RCD, Chlorantine Fast Blue P-8GLL.

Your inquiries are invited on CIBA "Paper-Proved" technical information, samples and color matching.

CIBA

Direct Yellow P-CD
Direct Yellow P-RCD

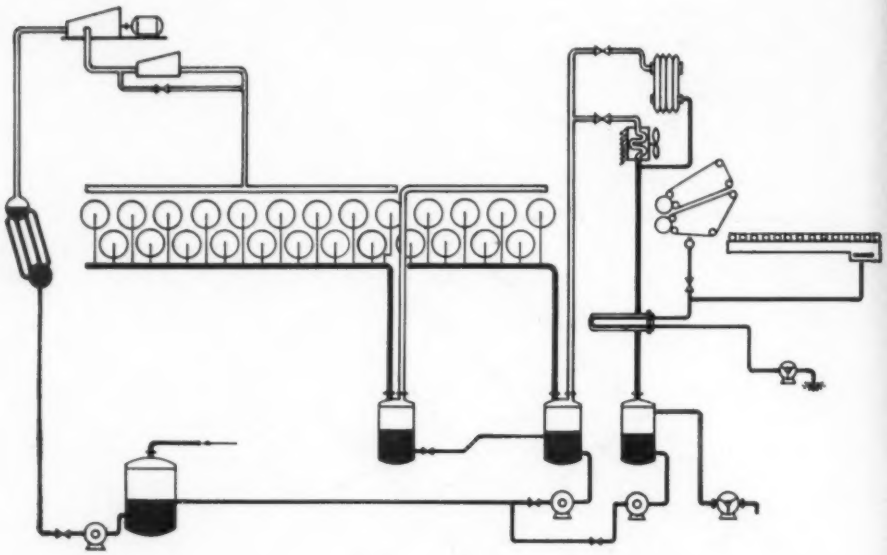
Chlorantine® Fast Blue P-8GLL

All three are versatile dyes, recommended for bond, ledgers, mimeo, offset printings and specialty convertings. In addition, these dyes have excellent light-fastness and good fastness to acids, alkalis and water. Bleaching with hypochlorite permits the use of the broke in other light shades. Pleasing shades of blues, yellows and greens can be obtained for facial, toilet and napkin stocks.

CIBA Company Inc., Paper Chemicals Department
Fair Lawn, New Jersey

RMF

DRYER DRAINAGE SYSTEMS



can pay for themselves from one to three years after installation

Experience has shown that RMF Systems can improve the operation of paper machines enough to pay their own way in a short time. This is true, whether they are to be installed along with new high speed equipment or to help modernize old machines. It is possible, because RMF Dryer Drainage Systems offer several advantages to help increase production. These include:

- Graduated dryer temperatures automatically assured
- Effective drying at lower temperatures
- Substantially increased drying capacity
- Less shrinkage, cockling, curling, wet streaks or hardening and far less broke

There are presently about 1000 RMF Dryer Drainage equipped machines in use today. They are operating testimonials to the efficiency of RMF Systems.

For more complete information on RMF Dryer Drainage Systems and other RMF products specifically designed for the paper industry write to:

ROSS MIDWEST FULTON · Dayton, Ohio

Division of Midland-Ross Corporation

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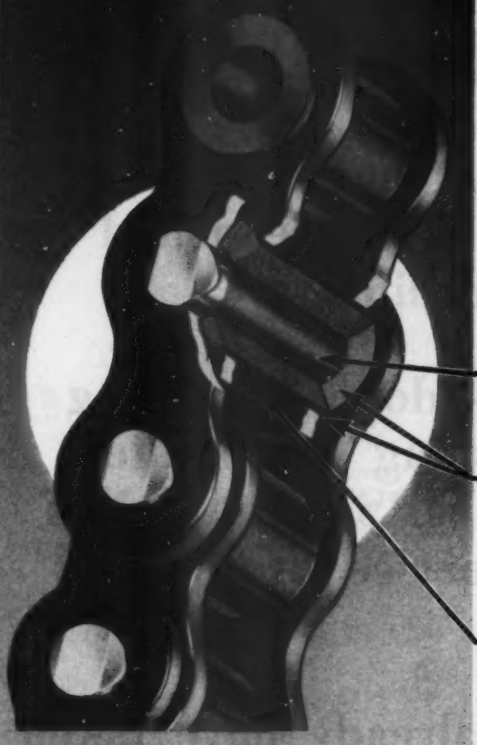
WHITNEY MSL CHAIN PROVIDES COMPLETE

BUILT-IN LUBRICATION

AT ALL 3 CRITICAL AREAS



Whitney MSL Chain is lubricated for life by oil-impregnated, sintered steel bushings—an exclusive development of Whitney Research. With this development, Whitney solves a basic chain problem . . . **more damage is caused by faulty chain lubrication than by years of normal service.** Pressure and heat cause built-in lubricant to expand and flow from bushings, providing a constant supply of lubricant to every working part of the chain. When drive stops, bushings re-absorb oil, ensuring a permanent oil supply for the life of the chain. By solving the lubrication problem, and because of other important design advantages, Whitney MSL Chain outlasts conventional chain as much as 5 to 1 in severe operating environments.

Critical Area 1

PIN—Protective film of oil completely lubricates the live bearing area between pin and bushing, minimizing wear by reducing metal-to-metal contact.

Critical Area 2

PLATES—Whitney oil-impregnated sintered steel bushings extend beyond surface of inside plates to: act as lubricated thrust bearings, control clearance, and provide an oil cushion between plates, eliminating plate galling and seizing frequently caused by misalignment of sprockets.

Critical Area 3

SPROCKET ENGAGEMENT—Oil film on exterior surface of Whitney MSL Sintered Steel Bushings provides constant lubrication between sprocket teeth and chain. Whitney MSL Chain requires no rollers, as the tough oil film on the bushing surface provides smooth sprocket engagement, cushions impact and reduces drive wear.

WHITNEY MSL CHAINS MEET ASA STANDARDS

All essential dimensions of Whitney Standard and Extended Pitch MSL Chain conform fully to ASA Standards, making it completely interchangeable with any similar pitch ASA standard chain, simplifying specification for new equipment, or as a replacement for existing drives.

Whitney MSL Chain is carried in stock by Distributors in all parts of the United States, for prompt delivery.

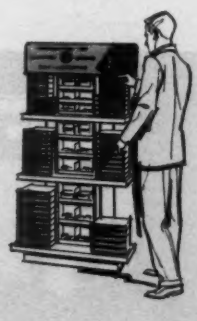
* **Maximum Service Life**

Whitney oil-impregnated bushings—developed through continuous Whitney Research—are produced exclusively by Whitney to assure MSL Chain users of highest quality and reliability.

Inherent material characteristics of Whitney Sintered Steel Bushings, plus bushing configuration that provides greater contact area between bushings and links, permit high interference fit, which pre-loads links and gives maximum fatigue resistance.

Controlled clearance between plates promotes self-cleaning action.

MSL Chain is carried IN STOCK by your Whitney Distributor. Ask him to show you how and why Whitney MSL Chain gives you more chain drive value per dollar.



THE WHITNEY CHAIN COMPANY

a subsidiary of FOOTE BROS. GEAR AND MACHINE CORPORATION

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POWER TRANSMISSION DRIVES

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Felt Facts

FILLING-UP PROBLEMS?

Try Albany's proven 1-2-3

Felt Washing Program!

Nearly everyone has the problem of keeping paper machine felts clean and open throughout their life.

Albany Felt has done something about this by establishing a separate department whose FIRST and ONLY function is to be of service to you in this vital area.

Many paper mills already have taken advantage of this new service. All have shown outstanding improvement with higher machine speeds, better drainage and prolonged felt life.

AF

ALBANY FELT COMPANY

ALBANY, N. Y.

The World's Largest Manufacturer of Paper Machine Felts

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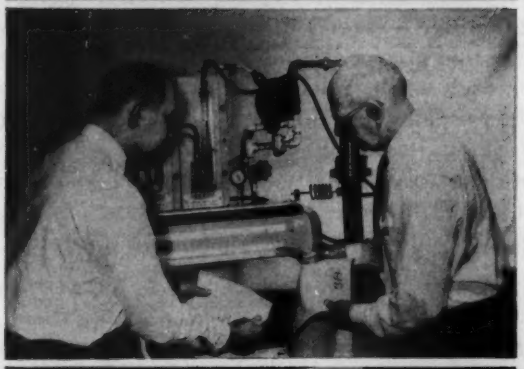
. . . . Here's How Albany's Felt Washing Program works!

1. On the spot analysis

Because there is no universal cleaning solution or felt cleaning method, our felt washing program engineer visits your mill to work with you on your individual problem.



2. Laboratory testing

Next we use the latest scientific equipment and chemicals to test portions of your used felts to discover the best cleaning compounds and washing equipment to fit your needs.

3. Written report

Specially trained engineers then submit a written report to you covering every phase of their recommendations of a felt washing program tailored to your operation.

If you feel your present felt cleaning procedures may be improved or if you wish information on the adaption of proven methods to your particular machines–

TALK IT OVER WITH YOUR ALBANY FELT SALES ENGINEER

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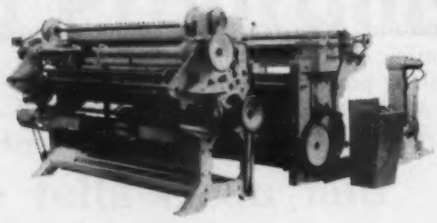
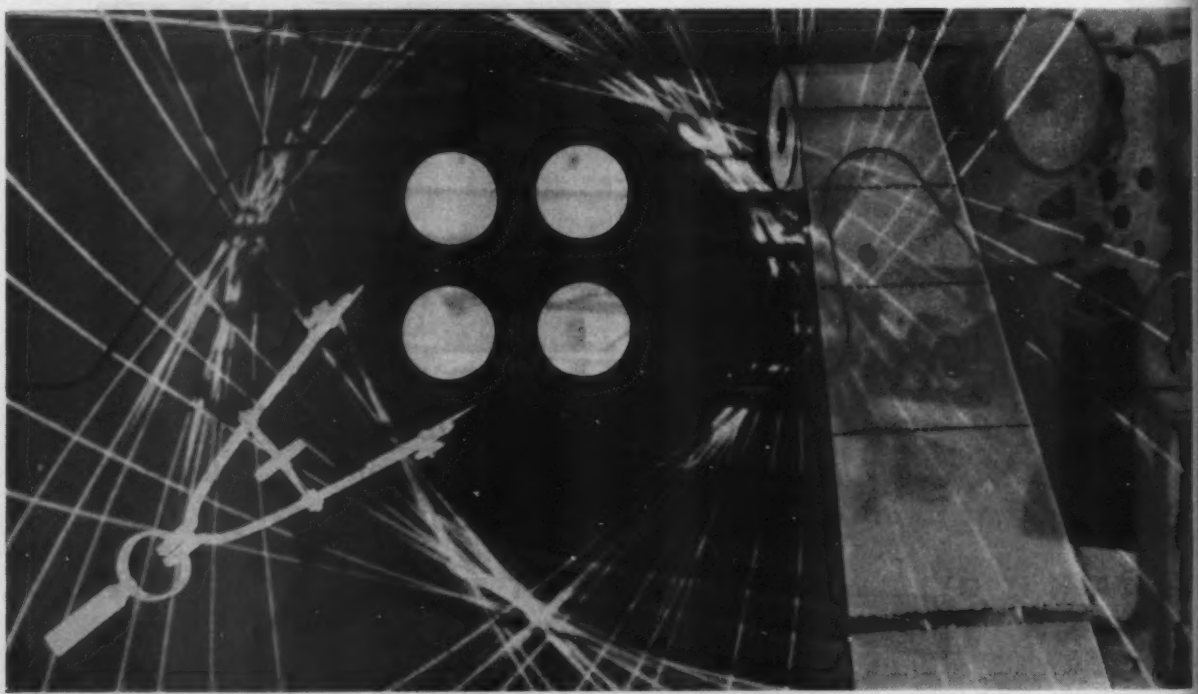
Creative engineering and development of converting machinery



New Rewinder — over 1,000 feet per minute, completely automatic! This new Model 2481 90" Rewinder operates continuously at speeds over 1000 feet per minute, automatically transferring the web for each set of rolls while running at full speed. One operator easily operates two of these rewinders because the mandrels remain in the machine and the automatic core loader eliminates manual labor. It has Paper Converting's new Shear-Cut Perforator, micrometer adjustment for accurate control of nip pressure on embosser, 60" diameter jumbo rolls with automatic constant tension dancer roll control. The ideas in this rewinder typify the *creative* engineering in all our converting machinery. Ideas that mean profit on your production line.

PAPER CONVERTING MACHINE COMPANY · GREEN BAY, WISCONSIN

Folders, Rewinders, Embossers, Napkin and Core Machines, Letterpress and Flexographic Presses, Special Converting Machinery



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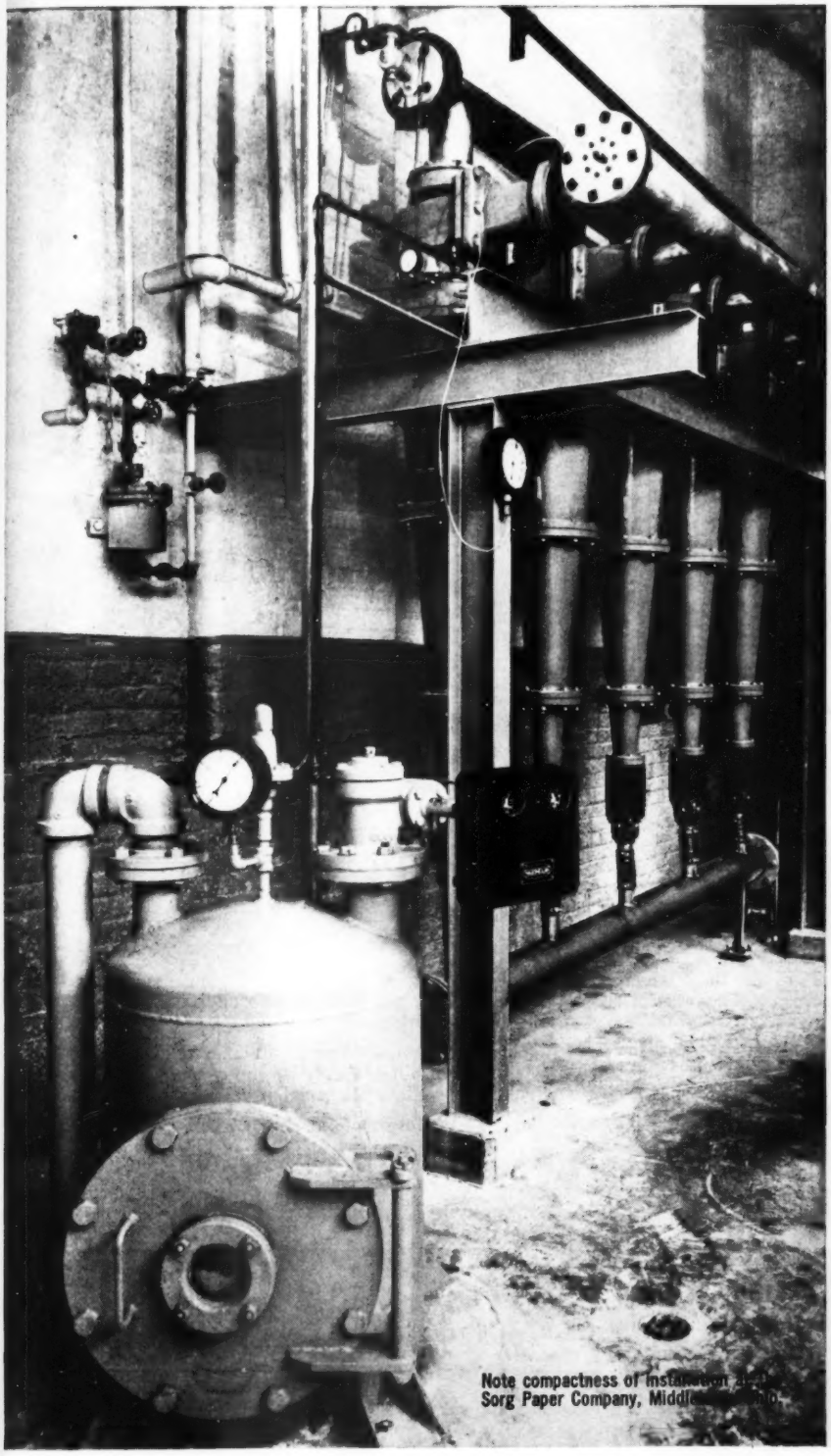
Feb

Bauer **Centri-Cleaners with Vacuum Rejects System***



Note compactness of installation ... Sorg Paper Company, Middle...

Eliminate air problems and provide cleaner stock at same time...

From over 100 mills using Bauer Centri-Cleaners equipped with the vacuum rejects system come reports like these:

Cleaner paper . . . improves formation on the wire, since air is kept from entering the cleaners and stock going to headbox . . . compact, neat installation . . . non-plugging . . . requires little if any maintenance . . . less wear . . . less downtime . . . eliminates need for eductors and their high pressure water system . . . reduces need for foam killers... improves quality.

If you want the best value in cleaners, get the details on this Bauer "package."

*U.S. Patents 2,878,934; 2,377,524; and 2,809,567. In Canada, 429,584; 565,199.

THE BAUER BROS. CO.

1706 SHERIDAN AVE.
SPRINGFIELD, OHIO

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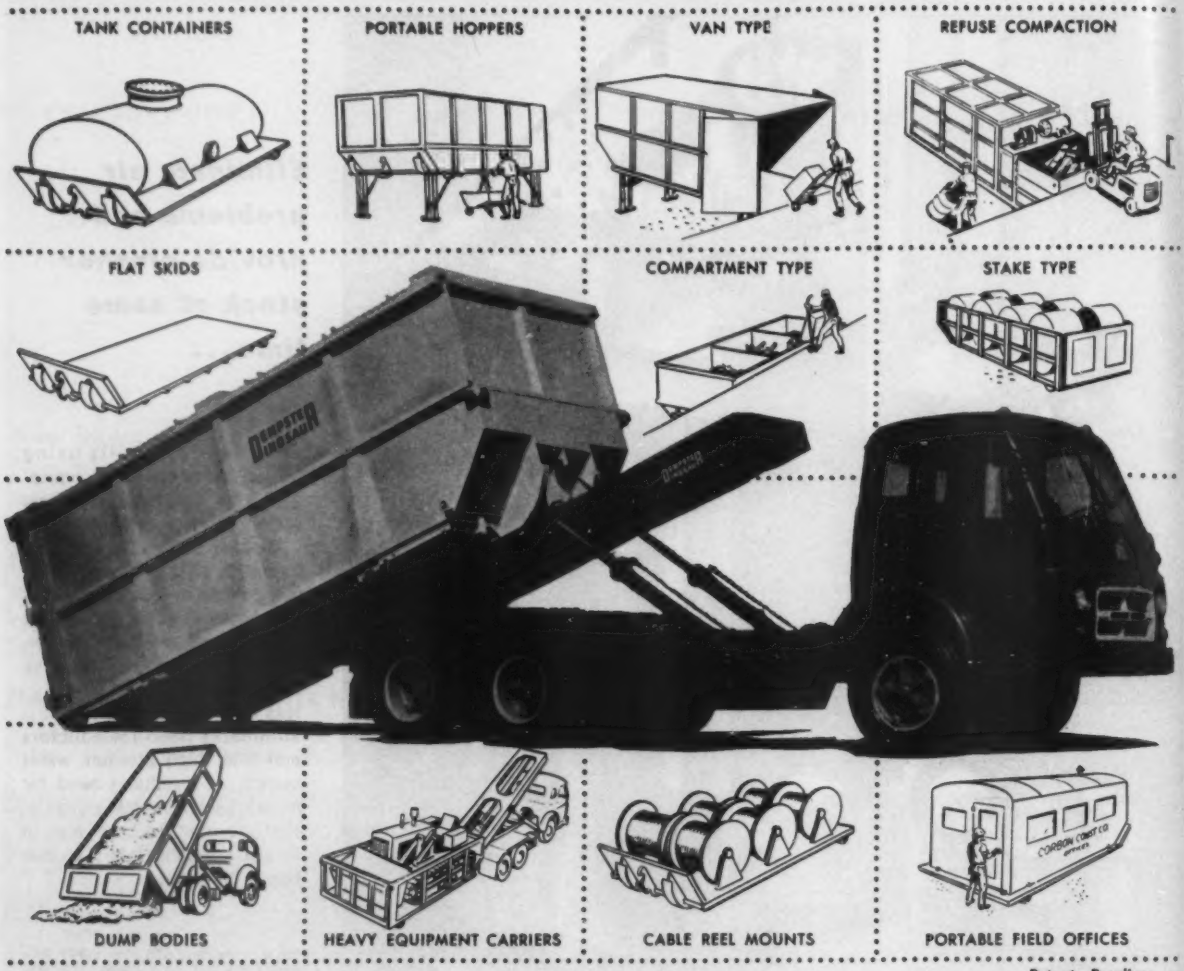
One DINOSAUR With Detachable Containers Solves Many Complex Materials Handling Problems



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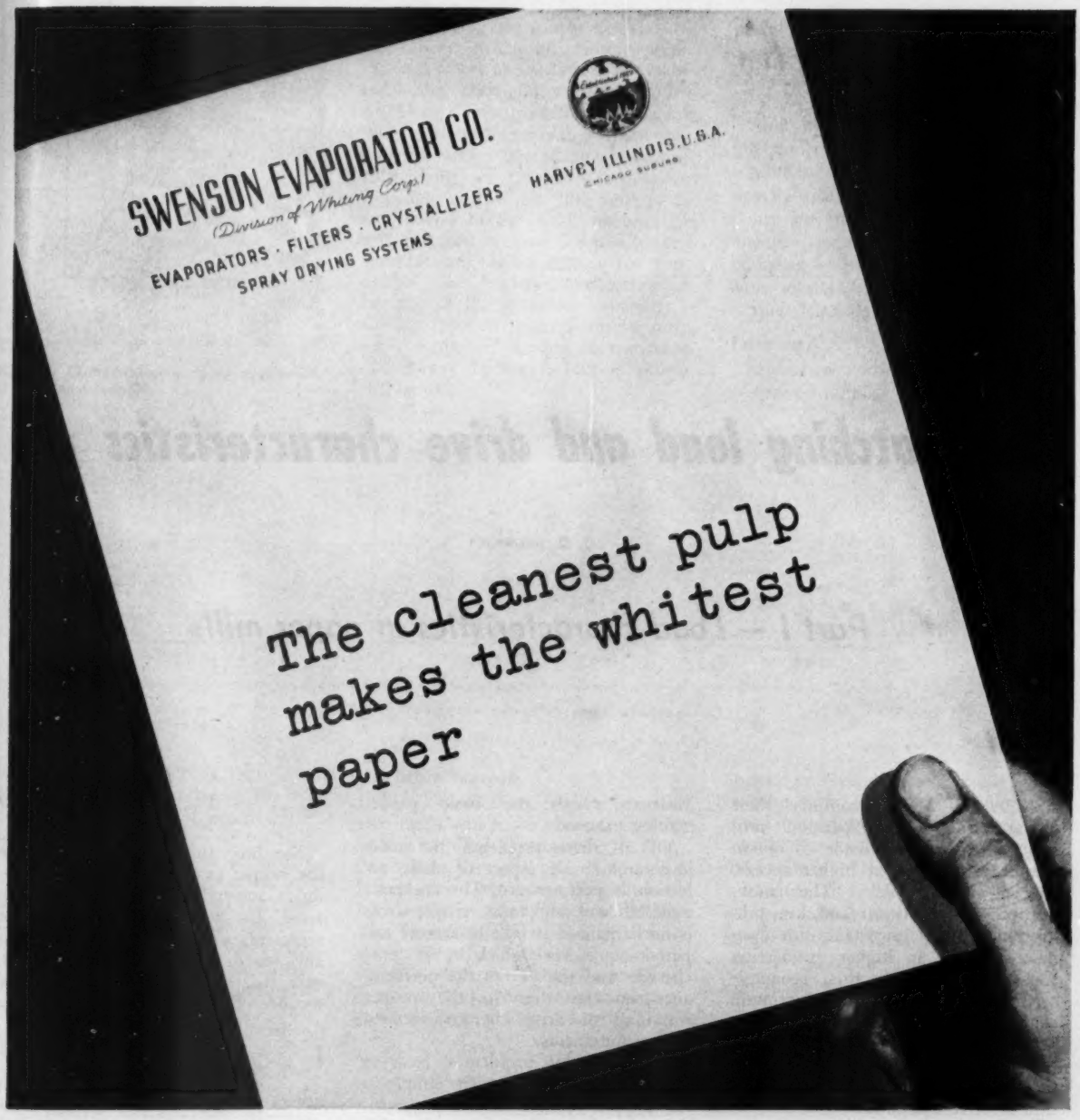

Clean pulp is a basic requirement for economical bleached pulp and white paper production. Swenson pulp washers provide this clean pulp—and produce it with an extremely low dilution of the recovered black liquor. As a result, both bleaching costs and chemical recovery costs are held to a minimum. These operating advantages are backed by proven mechanical reliability and such features as self-aligning roller bearings and high strength deck construction. Specify Swenson pulp washing equipment.

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Matching load and drive characteristics

C. G. HELMICK*

Part I — Load characteristics in paper mills

AS PAPER MILLS continue their modernization and expansion programs, demands are made to obtain greater production, at higher speeds, and of better quality. The consequences of breakdown and lost production, always important, are even more critical at higher production speeds. To add to this, economic selection demands the optimum combination of all capital, maintenance and operating costs, over the period of expected operation. All of these points figure into today's selection of drive equipment.

The proper application of adjustable-speed drives to these machines is one of the most important engineering problems facing the electrical engineer. Nowhere is this more important than in a modern paper mill. From the simplest washer drive to the most complicated sectional paper machine drive, great emphasis is laid on proper drive functioning. In addition, drives are called on to function continuously, day in and day out, without any costly interruption of production. All this must take place under extreme conditions of environment: heat, moisture, pulp overflow, and the all-pervading corrosive fumes associated with the basic papermaking process.

Of all these problems, the most important single aspect of drive selection is performance. The cheapest, most efficient, and most reliable drive is no bargain if it fails to achieve the performance for which it is purchased. And the key to the performance question lies in the proper matching of drive characteristics to load requirements.

This matching problem is basic to all drive selection, from the simple to the complex, and from the paper industry to the textile industry. For this reason, basic principles of matching drives and loads are developed in this paper, with general examples to illustrate their use.

The matching problem

The basic matching problem hinges on the word equilibrium. Load torque requirements must be balanced by drive torque availability under all operating conditions or equilibrium is upset. Upset can lead to (a) a stalled machine, (b) destructive conditions, or more fortunately, (c) acceleration to equilibrium at some other speed. This is implicit in the familiar equation of mechanics, that the summation of all torques must equal zero.

$$T_{motor} - T_{load} - J\frac{dw}{dt} = 0$$

See how this equation applies to the simple example of Fig. 1, showing a squirrel-cage motor applied to a fan. The intersection of these curves represents a stable operating point. At any speed below this stable point, note that motor torque exceeds load torque. This unbalance requires a $J\frac{dw}{dt}$ term to balance the equilibrium equation; the extra motor torque goes into acceleration as expected. Note also that the unbalance (and consequent acceleration) exists only up to the operating point, where load and motor torques are again balanced. Above the stable operating point, it is seen that the load torque exceeds the motor torque. This opposite unbalance returns in negative acceleration, and the speed slows down to the stable equilibrium point.

This equilibrium point is termed stable since any momentary disturbances produce corrective forces tending to restore equilibrium. The stability of an equilibrium point rests with the type of intersection which the load curve makes with the drive curve. It is the relative slope of the two curves at

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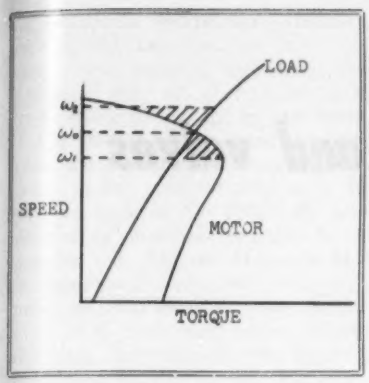

Fig. 1 — Curves showing stable equilibrium of motor and load.

ized by a constant torque demand include paper machines, printing presses, feed drives on machine tools, many conveyors, packaging machines, office machines, motor-generator sets, and a wide variety of general purpose machinery. Where equipment consists of rolls, belts, or cylinders turning in bearings, and where little energy is transferred to the work material itself, the load demand is typically constant-torque. (Drive motors for generators are usually constant-torque because of the generator capability.) Certain types of bearings may require extra torque at starting to overcome "breakaway friction." This is shown in Fig. 2C.

pears in combination with constant-demand and in combination with constant-torque loads at higher speeds. (Fig. 2C).

One important exception concerning pumps should be noted, to avoid misunderstanding. Not all pumps operate against fluid friction loads. A boiler feed pump, for example, usually operates against a constant pressure in pumping feedwater into a steam boiler. This results in essentially a constant torque demand.

Tension

An often encountered active load is that of holding tension. This may

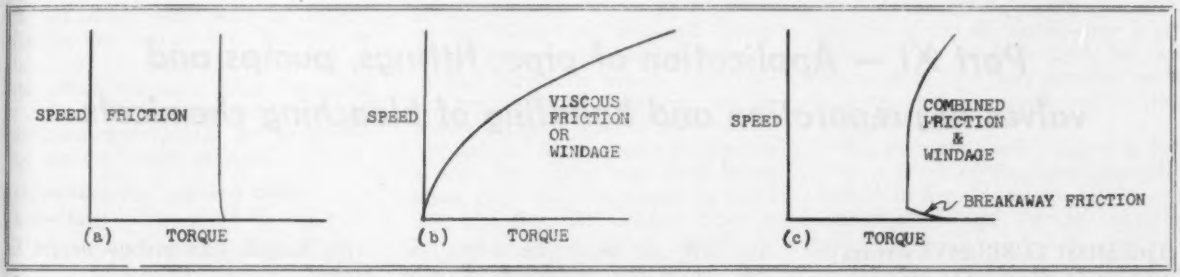

Fig. 2 — Speed-torque curves of typical passive loads.

this intersection which is the determining factor. The conditions for this kind of stability are summed up in Fig. 2.

To apply the technique of matching load curves and drive curves, it is necessary to examine typical examples of both. It is impossible to cover all types and variations of loads and drives, so necessarily some generalization is made and common examples given.

Load characteristics

Broadly speaking, loads may be classified as passive or active. Passive loads absorb energy and demand torque only in opposition to motion. Active loads, on the other hand, can transmit energy, demand torque whether or not there is motion. In this category are tension loads, gravity loads and wind loads. Included also are certain combinations whose load demands change with time, such as core-type winders. For specific characteristics of each type of load, refer to the curves shown in Figs. 2-5.

Constant torque

This is the most common passive load requirement because it is the characteristic of friction loading. Friction force is essentially constant regardless of speed, therefore the torque demand of such a load is also constant. (Fig. 2A) Common applications character-

Variable torque

This classification is given to passive loads which are characterized by viscous or fluid friction effects. (Fig. 2B). Fans, blowers and compressors fall into this class because their hydraulic loading is usually viscous friction. The "windage" effect associated with motors, or other parts rotating at high speed is primarily viscous friction, and it also displays the "variable-torque" demand. This windage load often ap-

appear in several forms: pulling or holding back, either against constant-speed delivery rolls, or against tension-setting "dancer" or "compensator" mechanisms.

The case of holding tension against delivery rolls is shown in Fig. 3, for both pulling and holding back. The case of dancer tension is shown in Fig. 4. In both cases it is seen that

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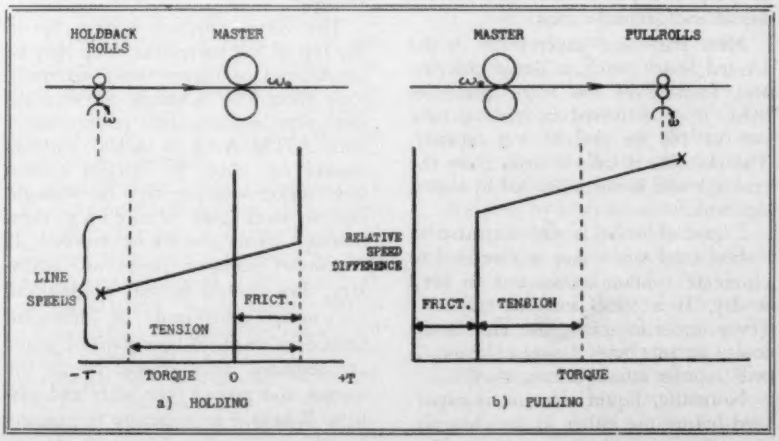


Fig. 3 — Speed-torque curves of active tension load — both pulling and holding back. (multi-section stretcher).

The use of pipe, fittings, pumps and valves in the pulp and paper industry

ROLAND L. ALLEN JR.

Vice President, Eastern Engineering Co.

Part XI — Application of pipe, fittings, pumps and valves in preparation and handling of bleaching chemicals

THE MOST CORROSIVE services encountered in the modern pulp and paper mill are found in the bleach plant and in the systems required to prepare and handle the bleaching chemicals. Construction of these systems from materials of maximum corrosion resistance is mandatory since the chemicals handled are both expensive and hazardous and any interruption in chemical supply will interrupt mill production.

Chlorine handling

Chlorine is used directly in the bleach plant in the chlorination stage and in the preparation of sodium or calcium hypochlorite for use in the hypochlorite stage of the bleach plant. Chlorine is handled in the majority of pulp and paper mills in both the liquid and gaseous forms.

Most pulp and paper mills in the United States purchase liquid chlorine and, because of the large quantities used, it is delivered by rail in tank cars of 16, 30, and 55 ton capacity. The chlorine is used directly from the tank car and is not unloaded to a storage tank.

Liquid chlorine is not corrosive to carbon steel when care is exercised to eliminate contamination and to keep it dry. If a small amount of water (even moisture from the air) is allowed to mix with liquid chlorine, it will rapidly attack carbon steel.

Normally, liquid chlorine is vaporized before use either in the chlorination stage or in the preparation of hypochlorite. Vaporized or gaseous chlorine will not attack carbon steel, at the temperature employed in pulp and paper mills, as long as moisture is not allowed to mix with the chlorine.

Since the exclusion of moisture from chlorine handling systems is so important, the compressed air that is used for padding the tank car and for purging chlorine from the tank car and the piping system, is dried before use with an absorptive type air dryer.

When chlorine is fed to the pulp at the chlorination stage or to the milk of lime or caustic solution at the hypochlorite making system, a barometric loop (at least 34 feet above the free liquid surface) must be provided to keep moisture from backing up in the system when flow is stopped.

The entire chlorine system up to the top of the barometric loop may be constructed of carbon steel materials. Pipe should be Schedule 80 seamless steel pipe manufactured in accordance with ASTM A-53 or A-106. Fittings should be 2000 lb. forged carbon steel socket welding type or wrought carbon steel butt welding type. Screwed joints should be avoided. If occasional screwed joints are necessary, they should be seal welded and no joint compound or lubricant should be used. Where flanged joints are required, they should be of the tongue and groove type with lead gaskets. Where it is necessary to connect to flanged valves, instruments or equipment without tongue and groove type flanges, lead gaskets should be used.

Valves should be cast or forged carbon steel with Monel stem and Hastelloy "C" disc and seat similar to Crane Fig. 1644 or Vogt Fig. 663-668.

The compresed air piping associated with the chlorine system should be constructed of the same materials and in the same manner as the chlorine piping.

After installation, the carbon steel portion of the chlorine and air piping systems must be purged of all grease and moisture. The oil and grease should be removed by filling the entire piping system with carbon tetrachloride and allowed to stand for at least two hours before draining. All valves and other equipment should be dismantled and thoroughly cleaned with carbon tetrachloride. All valves should be repacked using Teflon packing. After degreasing, it should be hydrostatically tested to 300 psig. in accordance with ASA Code B-31.1. After the hydrostatic test, the system should be thoroughly dried. This should be accomplished by passing steam through the system from the high end until it is thoroughly hot, blowing condensate and foreign matter out the low end. While the system is still hot, dry air (having a dew point of minus 20°F) should be blown through the system until it is thoroughly dry. The air used should be from the air dryer and oil free air compressor which are part of the system. Instrument components such

as rotameters, temperature elements, etc. should be removed from the system and replaced with temporary piping, if they are of such nature as to be liable to damage by the steam.

The portion of the chlorine system from the top of the barometric loop down to the point of feed with the pulp or hypochlorite should be constructed of materials resistant to attack by wet chlorine. Materials such as Saran-lined steel, lead-lined steel, polyvinyl chloride-lined steel, rubber-lined steel, lead, hard rubber, krolastic, glass, polyvinyl chloride have all been used for this service. The selection of the material used must be based on the requirements of the particular installation. One of the lined steel pipe materials will usually result in the safest system with the longest trouble-free service life, and can be installed for about the same cost as the other materials when the other materials are properly supported and enclosed with guards for protection against mechanical damage.

Hypochlorite making and handling

Hypochlorite may be made by chlorination of sodium hydroxide or milk of lime. The product of chlorination of sodium hydroxide is sodium hypochlorite and of milk of lime is calcium hypochlorite. The systems for each are similar, but not identical, and utilize the same materials of construction. The sodium hypochlorite system is simpler and more compact than the calcium hypochlorite system. This difference is mainly due to the fact that some solids must be removed from the calcium hypochlorite after chlorination, while the sodium hypochlorite is free of solids. Also the sodium hydroxide chlorination is more rapid than the chlorination of milk of lime.

The construction materials used for chlorine in the hypochlorite system have just been discussed. The construction materials used for sodium hydroxide (caustic or caustic soda) will be discussed later. The construction materials used for milk of lime are the same as for sodium hydroxide.

Although there is a slight difference in the corrosive nature of sodium and calcium hypochlorite, the same construction materials are normally used for both.

Piping may be the same as indicated above for wet chlorine service. Valves should be of the diaphragm type with flanged cast iron body lined with rubber, Saran or glass. The diaphragm should be Saran, rubber or Teflon.

Pumps should be of the centrifugal type and should be constructed of Duriron, glass-lined cast iron, or hard rubber-lined cast iron.

Caustic handling

Sodium hydroxide or caustic is normally purchased in 50 per cent or 73 per cent liquid form, and diluted to the concentration required for use in the hypochlorite making system and for use in the caustic extraction stage in the bleach plant. When 73 per cent caustic is purchased, it is usually diluted to 50 per cent before storage.

All piping for 73 per cent caustic service or for 50 per cent caustic service at 140°F or higher should be Schedule 10 nickel. Piping for 50 per cent caustic below 140°F or for concentrations lower than 50 per cent may be carbon steel. Piping for 73 per cent caustic service must always be steam traced and insulated. Piping for 50 per cent or lower caustic service may frequently require steam tracing and insulating, depending on the lowest expected ambient temperature. Where the temperature of the air around the piping may drop below about 70°F, the lines should be traced and insulated. All outdoor lines at all usual concentrations should be traced and insulated.

Where nickel piping is used, all welded or welded and flanged construction should be used. Where carbon steel piping is used, the same type of construction should be used, but where an occasional screwed joint is necessary, they should be seal welded.

Where nickel piping is used, the pipe should be Schedule 10, as stated before. Fittings should be of the butt weld type of the same wall thickness as the pipe. Flanged joints should be of the lap-joint type.

Where carbon steel piping is used, the pipe should be Schedule 40 manufactured in accordance with ASTM Specifications A-53 or A-120. Pipe to be bent should be ASTM A-53. Fittings should be 2000 lb. forged steel socket weld type for lines 2 inch and smaller and steel butt welding type for larger sizes. Where flanged fittings are required in piping larger than 2 inch, 125 lb. cast iron flanged fittings may be used.

Gaskets should be 1/16 inch thick blue African asbestos for all services.

Valves for caustic service should be selected with care. Single wedge gate valves and lubricated plug valves both are satisfactory. Many all-iron valves are used for caustic service, but do not have a very satisfactory performance record in most installations. Depending on concentration and service temperature, valves of 3 per cent nickel cast iron with stainless steel trim, type 2 Ni-Resist with stainless steel trim, "Causul" metal with stainless steel trim, all 316 stainless steel or all nickel, will be more economical on a long range basis than all iron valves.

Centrifugal pumps of the single-suction, open-impeller type are the most satisfactory for caustic service. For 50 per cent or weaker solutions of less than 140°F, nickel cast iron stainless steel fitted construction is satisfactory. For service at higher concentration or temperature, construction should be all stainless steel or some other higher nickel alloy.

Peroxide handling and solution preparation

Peroxide bleach solution as fed to the peroxide stage of the bleach plant may be made up from either sodium peroxide or hydrogen peroxide. For purpose of this discussion, there is no difference in which is used; but we will assume hydrogen peroxide since it is the most frequently used for the large installations.

The peroxide bleach solution as fed is a solution of hydrogen peroxide, sodium hydroxide, sodium silicate and magnesium sulfate (epsom salt) in water.

Hydrogen peroxide as purchased is 50 per cent solution by weight. It should be handled in aluminum or stainless steel piping and stored in aluminum tanks. Where piping is in continuous contact with hydrogen peroxide, aluminum pipe and fittings should be used. Aluminum Association alloys 1060, 1160, 1260, 5254 or 5652 may be used. All joints should be welded or flanged. Gaskets should be Tygon or Teflon. Aluminum pipe should be Schedule 40.

Valves should be of stainless steel or aluminum alloy. Gate or diaphragm valves may be used. Diaphragm should be polyethylene, Tygon or Kel-F.

Before the system is placed in service it must be passivated with nitric acid. Assistance should be obtained from the hydrogen peroxide supplier to assure proper passivation.

Pumps of the single-suction centrifugal type should be used. They should be constructed of all high nickel alloy such as Worthite or Ircamet, and should have Teflon packing.

Sodium hydroxide should be handled as described before under "Caustic Handling", and sodium silicate in the same manner.

Magnesium sulfate solution should be handled in Schedule 10 type 304 or 316 stainless steel piping. Joints should be welded or flanged. Where screwed joints are required, screw

(Continued on page 784)

Quality control vital in producing paper machine felts

PERRY H. BROWN
Director of Quality Control
Albany Felt Co.

Perry H. Brown demonstrates latest electronic tester for determining yarn uniformity.

▶ Only with a never-ending quality control system, can a felt be produced to fully meet the exacting demands of an ever-expanding paper industry.

WHEN ONE remembers that paper machine felts must be able to operate at speeds ranging from under 100 to over 3200 fpm, it is readily understandable why the manufacture of felts for paper machines require an exactness of design and of quality control seldom called for in any other field of the textile industry.

But withstanding punishing speeds is not the only requirement of a paper machine felt. It has two other initial functions: (1) removal of large quantities of water from the stock and (2) imparting the desired finish to the paper. In the case of a multi-cylinder bottom felt, it also acts as a driving belt for the machine.

To further complicate the picture, felts must often face continual dousing with a wide variety of chemicals such as acids, alkalis and various additives, plus other materials such as clays and fillers that are combined with the furnish and which can fill the felt very badly. In addition, a felt is subjected to heat and pressure under a wide range of manufacturing conditions.

With all these factors to take into consideration, it becomes obvious that a paper machine felt must be custom-built if it is to contribute to maximum production.

Since 1920, when the Albany Felt Co. first developed the theory of custom-made felts for particular positions on paper machines, high level quality has been our primary objective. Albany Felt maintains a staff of ten fully trained quality control engineers, analysts, and technical personnel who constantly check every phase of production — right from the sorting of raw wool through to the final finishing procedures. This staff reports directly to the director of quality control who in turn is responsible to the plant manager. In addition, over 37 individuals are directly involved in quality control functions in the various manufacturing departments.

Felt design

The first step in quality control occurs when each new order is sent to the design department. Designers determine, from the sales or service engineers' reports, the specifications necessary for the particular order. The proper wool (and in many cases the synthetics) to use, the size of the yarns, their weight, twist and strength are defined. The physical requirements of the felt, such as

the weave, length, width, tension, porosity and finish are carefully evaluated to provide the maximum drainage (production), finish, and life.

The order then goes from design to the production control department for scheduling and then to the mill departments for manufacture.

Sorting and scouring

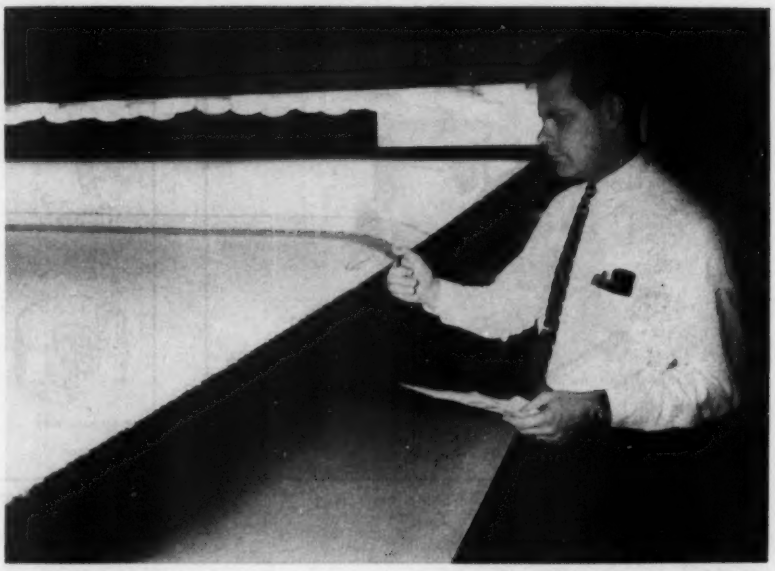
In wool sorting, the grease wools as received from the sheep ranches throughout the world are inspected and classified. Sorting requires many years of apprenticeship before a man is qualified to accurately judge and sort the wool, which is done entirely by hand. As many as 10 different grades of wool can be obtained from the fleece of one particular sheep, and it is the duty of the sorters to see that these fleeces are separated into the proper grades. After sorting, each grade is again checked by inspectors to assure uniformity and consistency of length, diameter, and strength of fibers.

Next, the raw wool must be cleaned to remove the natural impurities such as dirt and grease. In this operation, called scouring, the cleanliness of the wool is constantly checked in regard to its grease content, foreign matter and moisture against prescribed specifications.

Blending and carding

In wool blending, more than 200 combinations of wool types and grades are used. The desired varieties of clean wools are mixed together (and often with synthetic fibers) to get the desired characteristics necessary for the ultimate yarn. Each blend used has previously been carefully analyzed so that the best qualities of the wools used can be obtained, always keeping in mind the end result for which the felt is intended. Blend sheets are kept as a permanent record so that it is possible to tell at all times what wools and synthetics were used in any particular felt and in turn what effect they had on the felt's performance on the paper machine.

Following blending, the fibers are carded. In this operation, accurately weighed portions of stock are fed at regular intervals into machines where rolls covered with wire points comb and brush the fibers into long, loose strands. Each batch is carefully tested for weight. It must fall within prescribed tolerances, or be rejected. A record is kept of each weighing and is added to the growing history of the felt. Eventually all these records become the felt's "pedigree".



The finished felt is checked on the dryer and compared with quality control specifications.

Spinning

The next step is spinning of the wool strands into yarn. Here special care is needed to insure the yarn has the proper weight, strength and twist. Albany Felt makes more than 500 types of yarn in various blends and weights with each yarn having its own individual specifications. Inspectors determine whether the yarn meets these standards. Otherwise, it is rejected.

The twist specified for each yarn is indicated by the basic wools used, the blend, and the use for which it is intended. Some yarns are hard-twisted for strength; others soft-twisted for cushion. Yarns may weigh as little as 4 ounces, or as much as 15 pounds per mile.

After the spinning of the yarns is completed, each batch is tested for weight, strength, and twist. In addition, the uniformity of the thread is checked on a special electronic uniformity analyzer and again is compared with set standards.

Weaving

Following spinning, the yarns go through a series of preliminary operations called dressing and drawing and are then ready for weaving in the looms.

In the weaving operation, which is one of the most critical in felt manufacture, the felt takes shape for the first time. A beam of yarn often containing several thousand ends or threads is placed in holders at the rear of the loom. The loom is then adjusted for shuttle firing sequence and harness action in a complex procedure that requires several hours in order to make certain that the loom will weave the felt in accordance with design specifications. Areas which are carefully checked include the number of crosswise and lengthwise threads per inch, the tension on the yarns, the weave itself, and the overall action of the loom.

The entire weaving operation culminates in a quality inspection of each felt immediately after it is removed from the loom. In this inspection over 20 separate categories are checked in each felt. Any off-standard areas are noted on the manufacturing records which in turn become a permanent history of the felt while the condition in the felt itself is corrected or the felt is rejected.

Joining and fulling

This same tight quality control is maintained through the burling, mending, and joining operations which follow weaving.

In the delicate joining process, felts that are too long or too fine to be woven endless are joined by hand. The joining of felts is so skillfully done that only an expert can detect the joined area. Again, as in every subsequent operation, the burling, mending and joining of each felt is inspected by teams of specialists to guarantee the highest quality of felts. Each error, no matter how minor, is listed on the

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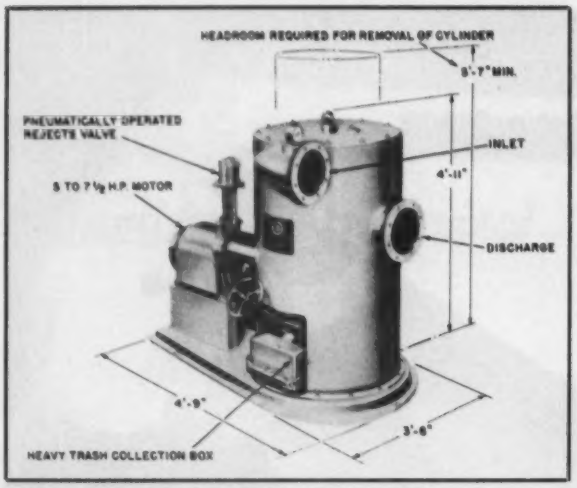


Fig. 1 — View of the 12-P Selectifier screen.

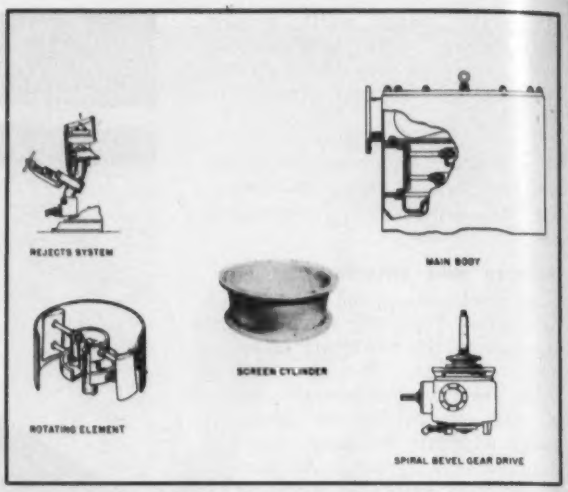


Fig. 2 — Five key components of screen.

Development of the 12-P Selectifier screen for small machine application*

ARTHUR STERNBY
Sales Engineer, Shartle Division
Black-Clawson Co.

Use of Selectifier screens results in savings from increased wire and felt life and decreased down-time; reports also point to reduced steam consumption and elimination of air, foam and slime problems.

SELECTIFIER screens are used for last chance cleaning of stock ahead of the paper machine to remove pine scales, shives and other foreign material, thus improving wire and felt life as well as the quality of the sheet. Improved formation and strength tests due to deflocculation of fiber bundles has also resulted. Consequently, mills have fewer breaks on machines—which means increased production.

Reports from mills show that these screens pay for themselves in savings from increased life of wire and felts and from decreases in downtime. Similarly, reports point to reduced steam consumption per ton of paper at the dryers, elimination of air, foam and slime problems, and to lower quantity of costly top liner furnishes.

The capacity range of the 24-P Selectifier screen, as originally developed, satisfied the majority of paper machines. The maximum capacity of this screen is approximately 3500 gpm. This capacity, however, will vary from one set of mill conditions to another, depending upon hole sizes and consistency and type of furnish.

Many paper mills are without machine screens today because no screen has been available to functionally or economically satisfy their requirements. To meet the needs of such mills, Black-Clawson Co. developed the 36-P, the 30-P, and most recently, the 12-P screen to augment the 24-P screen. The capacity ranges of these units overlap to satisfy economically the requirements of low tonnage specialty mills, such as predominate in the New England area, and of the large kraft mills, now scattered through the South and the West Coast.

The 12-P Selectifier screen

The 12-P Selectifier screen (Fig. 1) has been developed specifically for application on small fourdriniers and on single vats on cylinder machines with low gallonages. The maximum capacity of that of the 12-P is approximately 1/3 of the 24-P, or about 1200 gpm. at 0.5 per cent consistency. This unit is small and compact. It has low horsepower requirements and utilizes most advanced ideas of design in its construction.

*Abridged from a paper presented at the PIMA Connecticut Valley Division meeting, October 2-3, 1959.

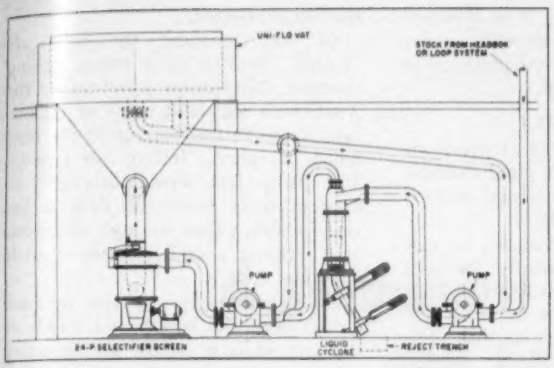


Fig. 3 — Typical hook-up for a selectifier screen.

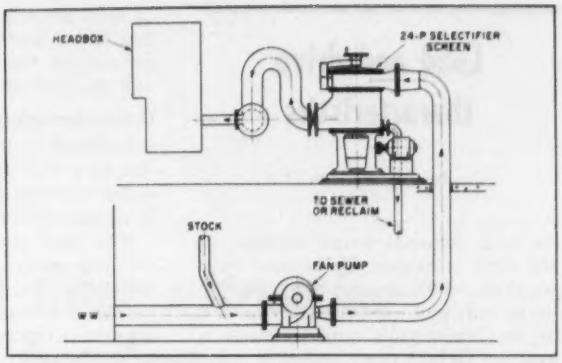


Fig. 4 — Selectifier screen hook-up on fourdrinier.

To understand why pressurized screening has been so successful, let us examine the construction of the 12-P Selectifier screen. This screen, like the others in the series, is a vertical, totally-enclosed, rotary screen which operates completely full of stock and under pressure at all time. The entire unit, including the drive motor, is mounted on a common base. This arrangement allows the screen to be placed almost anywhere. It requires no special foundation or supporting members. Stock enters through an 8-in. tangential inlet at the top, passes downward and outward through the screen plate and discharges through an 8-in. outlet on the outside of the cylindrical housing.

Reject material, or material which will not pass through the cylinder perforations, is continuously forced downward to a reject volute. Extremely heavy material (such as metals, sand, scale and the like) pass through an opening in the bottom of the volute into a heavy trash box.

Lighter materials (such as fiber bundles, shives and other light floating trash) continue past this opening through a 3-in. diameter reject volute. The end of the reject volute is fitted with a 3-in. flanged connection to which is attached a V-notched slide valve. This valve can be handwheel-operated for a continuous bleed, or it can be automatically actuated by a pneumatically operated cylinder and control panel for a continuous bleed with a periodic purge.

To expose the interior of the screen, it is only necessary to remove the nuts holding the cover in place and to lift the cover away. This exposes the entire interior of the screen for inspection. The cylinder assembly can be easily lifted from the screen manually. To make ready for this operation requires only the removal of three nuts which hold a retaining ring in place and the lifting away of the retaining ring.

Five key components

There are five key components to the selectifier screen (Fig. 2). These components are:

1. Main body with inlet and discharge openings.
2. Screen cylinder assembly
3. Rotating element
4. Drive mechanism which governs the rpm of the rotating element.
5. Reject system

Each of these components can be adapted to provide the best screening arrangement for a particular screening application. The manner in which they are adapted is vitally important for the best and most economical performance of a screen. The experience gained from the various Selectifier screen installations (utilizing the complete records of all Selectifier screen installations covering practically every type of furnish) enables us to apply each Selectifier screen for the utmost in screening efficiency.

The main body

The main body with inlet opening and discharge opening is fabricated as an integral unit from Type 316 stainless steel. Both the inlet and the discharge opening is fixed at the factory in accordance with customers piping arrangements. Also incorporated in the body of the screen are fittings to receive the stationary perforated cylinder assembly and the drive mounting.

Screen cylinder assembly

The screen cylinder is 24 in. in diameter by 10½ in. high. It is made from punched and rolled Type 316 stainless steel plate. Adequately reinforced on the outer diameter at the top and bottom by two Type 316 stainless steel bands, the assembly is disposed vertically inside the cylindrical housing of the main body.

The cylinder assembly in the 12-P can be equipped with a range of hole sizes to meet any application. The standard hole diameters are .062 in., .079 in., .094 in. and .125 in. Recently developed perforating equipment makes it possible to standardize on 12-gauge stainless steel for .079-in. and larger holes. Fourteen gauge is used for .062-in. holes. With the development of the perforating equipment, a minimum of cylinder failures has resulted. Special equipment was even developed for deburring the perforations—insurance against fiber hangup, and the plugging or formation of strings during operation, Cylinder breakage, a problem of the past, has been overcome by going to heavier 14-gauge and 12-gauge plates. The use of a single, strong, long-life cylinder assembly of simple design means low replacement cost.

The screening cylinder is positioned and held at the top by the retaining ring, and at the bottom by a replaceable seat ring. This seat ring prevents wear at the main body, and prevents contamination of the accepted stock by the unscreened stock.

Rotating element

The rotating element is comprised of two airfoil bars diametrically adjustable from the cage to which they are mounted. The counter of the bars, the adjustable clearance between the bars and the cylinder plate surface, and the speed of the bars are arranged for proper intensity and frequency of the pulsing of the fluid mixture to prevent the fibers from matting. This pulsing action also assures that materials of approximately the size of the hole cannot become lodged in the perforation.

The design of each airfoil bar is

(Continued on page 784)

Load and drive characteristics

(Continued from page 771)

the load demands torque whether or not there is motion. To be sure there are limits in either case; either the delivery rolls pull until the sheet breaks, or the dancer pulls until its travel is used up. In both cases, energy is transmitted by means of the load.

Consider further the curves of Fig. 3: the case of tension against constant speed delivery rolls. Ordinarily there is a friction component to this load due to roll bearings, and this is the only load until the roll surface speed matches the delivery speed. Any further speed difference now establishes tension. (Increase in surface speed for pulling; decrease, for holding back.) This accounts for the near-horizontal slope of the load curve, which is dependent on product elasticity and machine geometry. The "X" indicates rupture limits of the material.

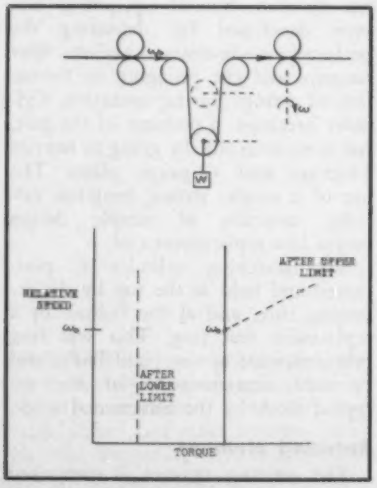


Fig. 4 — Characteristic curve of pulling tension against dancer mechanism.

Fig. 4 describes the dancer mechanism which establishes tension in the material regardless of roll speed — at least within its limit of travel. While within limits, the constant tension produces a constant torque demand. Different delivery speeds result in a different operating point on the same curve. The dotted lines merely indicate that there are limits of travel, after which the dancer plays no part in load determination. It is apparent that these limits will depend on the dancer and machine configuration, as well as operating speed.

Time-changing loads

Included in this category are loads that vary with time. A good example is the core-type winder, found in nearly all phases of industry.

This load is time-changing because the roll radius continually increases with time. For any given roll radius the load demand is the familiar tension characteristic curve. As the radius grows, however, load torque (product of tension and radius) and drive speed (surface speed divided by roll circumference) both change. This gives rise to a family of tension curves to describe the winder load at different values of roll build-up (Fig. 5).

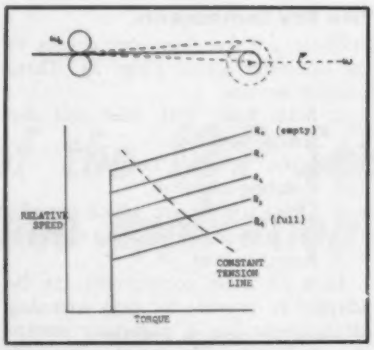


Fig. 5 — Speed-torque of active load changing with time.

In order to hold constant sheet tension during build-up, it is necessary to cause the operating point to shift gradually along a prescribed path. This path is the dotted curve in Fig. 5, which can be shown to be a constant-horsepower curve. If tension and surface speed are both constant, their product, which is a measure of tension horsepower, is also constant.

It is important to recognize that the dotted curve for constant tension is the desired curve, but that at any particular roll radius the actual load is the solid curve. It remains for the drive to constrain operation to only those points lying on the dotted curve.

Quality control in paper machine felts

(Continued from page 775)

manufacturing record accompanying each felt and of course is corrected or the felt is rejected.

In wet finishing the felts are "fulled" to size in a rotary fulling machine. Mechanical pressures on the wool, with soap and water as a lubricant, cause an interlocking of the fiber which is called "felting" or fulling. The damp felt, woven originally to approximately twice the desired finished width, passes through an adjustable "throat", and between heavily weighted rolls.

At regular intervals the operator checks both the length and width of the felt while it is still in the rotary machine and records the measurements for comparison with the fulling records of previous felts of similar specifications for the same position.

Also checked in this department in addition to length and width, [illegible] vital factor of tension which must fall within predetermined design specifications. This step is done on a special machine, a unique operation at Albany Felt as far as the felt industry is concerned.

After a felt has been fulled it is napped and singed, if necessary, and then dried. On the dryer the length, width and tension, as well as the overall appearance of the felt are checked and recorded on the manufacturing card which accompanies the felt. (Fig. 2)

Final inspection and checking of performance

Upon removal from the dryer, the felt is given a final inspection. This is a final check on all the inspections that take place at each stage of the manufacturing process. Each area of every felt on both sides is now inspected for any defect and should one be found, it is either corrected or the felt is rejected.

Records, as maintained at each of the 120 check points, are filed along with the manufacturing of each felt to assure the maintenance of the same high quality in future felts for the same machine positions.

Quality control does not end with the shipment of a felt. Sales and service engineers are continually checking on the operation of each felt on the paper machine, passing along information to the design and quality control departments for insertion in the felt records for the particular customer and position. This information is vital, for unless we know how the felt actually performed on the paper machine all of the multitude of quality control procedures, inspections, use of statistical techniques, and testing equipment cannot be adjusted for use in the later production of felts of the same or similar design.

A symposium on fiber attraction and fiber bonding

LOUIS E. WISE

The Institute of Paper Chemistry

THIS SYMPOSIUM, sponsored jointly by the Fundamental Research Committee and the Interfiber Bonding Committee of TAPPI, was held at the Institute of Paper Chemistry, Appleton, Wis. on September 9-11.

Pulp and paper companies from at least 26 states sent representatives. There were 16 auditors or participants from Canada, and registrants came from Sweden, France, Germany, England and New Zealand. Research workers arrived from the New York State College of Forestry; from the U.S. Forest Products Laboratory; from the Northern Utilization Research and Development Division of the Department of Agriculture; from the Prairie Regional Laboratory at Saskatoon, Canada; from the Technische Hochschule at Darmstadt, Germany; and from the Pulp & Paper Research Institute in Montreal. The meeting, attended by 240 chemists, physicists and engineers, thus took on the character and spirit of an international gathering, the importance of which will be obvious from the brief abstracts which follow.

The symposium began with the discussion of the principles of adhesion, under the chairmanship of Dean Roy Whitney. Dr. Alfred H. Nissan, of Rensselaer Polytechnic Institute spoke, with quaint humor and aided by some excellent slides, on the **Fundamentals of Adhesion**, giving a brief review of cohesive forces and the structure of cellulose. He postulated a simplified model for the cellulose sheet, in which non-yielding rodlets were present in a homogeneous hydrogen-bond-controlled amorphous region taking up the strain energy. In postulating an approximate theory of strength, Dr. Nissan used two concepts: (1) that a chain *e.g.* cellulose) is as strong as its weakest link and (2) that statistically the larger the number of links, the weaker will be its weakest link. Long chains, while relatively weaker, paradoxically would require higher rupture energy than would short chains. The statistical hypothesis appears to be in rather good agreement with observed facts. In the light of the latter, the original model was refined, and it was possible to estimate the contributions made by van der Waal's as well as the hydrogen bond contributions to the rupture energy.

Dr. J. A. Van den Akker of the Institute of Paper Chemistry then spoke on the **Structural Aspects of Bonding.** Besides discussing in some detail the probable physical nature of the fiber-to-fiber bond and the manner of bond deformation, he presented the conclusions of various investigators on hydrogen bonding, and some of the factors which govern the creation of the fiber-to-fiber bonds. He also described methods for estimating bonded areas, fiber-to-fiber bond failure, and certain desirable objectives for future research.

The **Principles of Web Adhesion on the Papermachine** was discussed by B. Radvar, Wiggins Teape Group Research Organization, of Beaconsfield, Bucks, England. This included the work of G. O'Blenes. A laboratory apparatus for measuring adhesion of a wet web to solid surfaces was devised, which simulated breaks in an open draw. The data on regions of instability, with respect to breaks were confirmed by observations made on a paper machine, and on the basis of this study, the underlying theory and the design of paper machines was discussed.

With J. J. Shipman (Kimberly-Clark Corp.) in the chair, the **Development of Wet Web Strength** was presented. Dr. H. Erfurt, of the Technische Hochschule in Darmstadt, Germany, spoke of his work and that of Professor W. Brecht, on the **Wet Web-Strength of Mechanical and Chemical Pulps.** A new testing device was developed which determined the stress-strain properties of paper in a moisture range between 10 and 87 per cent. Results with this apparatus indicated that the web-strength during drying followed an exponential function with respect to the solid content. The strength at a high water content depended on the friction between fibers whereas, when the moisture content was low, interfiber-bonding played a role. The influence of beating and fiber swelling on wet-strength was discussed. Certain simple laws, concerning the relationship between the percentage fines and wet web strength were described.

The **Fiber-Water Association and Wet Web Behavior** was presented by A. A. Robertson, of the Pulp and Paper Research Institute of Canada. Graphs were used to show the changes in tensile, elongation and caliper when wet webs were dried progressively within the range of 10 to 50 per cent solids. A critical solids content could be determined which

marked the disappearance of "free" water from the web. "Associated" water was also determined. The properties of the latter and the mechanism of fiber-water association were discussed in terms of various experimental methods based on (a) the drying rate, (b) dye mobility, and (c) the water retained under hydrostatic tension. Each of these measured a portion of the associated water. A comparison of these methods served in distinguishing between mobile and immobile water, and how to measure them.

The following day, with G. K. Dickerman of Consolidated Water Power & Paper Co. in the chair, the morning was devoted to the **Fiber Properties affecting Adhesion.** S. F. Kurath, of the Institute of Paper Chemistry gave a paper on the **Dynamic Mechanical Properties of Wet Pulp.** The wet pads studied were made from a pine bleached kraft pulp, and were studied in some detail. Real and imaginary components of the complex shear modulus, as well as the normal stress required to compact a pad, were investigated as functions of pad concentration. Compression had no effect on the frequency dependence of the complex shear modulus or on the mechanical loss tangent. Dr. Kurath discussed the possibility of reducing mechanical data to a common internal pad geometry as a means of comparing the mechanical properties of wet pulps. A reference complex shear modulus was obtained that was directly related to the flexibility of individual fibers.

As shown by W. E. Cohen, A. J. Stamm and D. J. Fahey (and reported by the latter) **Dimensional Stabilization of Paper by Heat-Treatment and by Cross-Linking with Formaldehyde** could be effected. To attain a certain degree of stabilization on heating, catalysts such as volatile acids, acid salts, but preferably sodium hydroxide were added to reduce the time and temperature of heating. Certain of these treatments reduced the swelling and the shrinkage by as much as 60 per cent. Furthermore, greatly increased wet-strength properties were obtained. When heating was too extensive, certain dry strength properties decreased, but even then wet strength properties still increased. Of the catalysts used, sodium hydroxide had the least adverse effects on strength, wheras acid catalysts caused loss in tear, folding endurance and burst. Much higher wet strength properties were obtained with formaldehyde (cross-linkage) treatments than by the catalytic heat treatments when these were carried to about the same degree of stabilization. However the alkaline heat treatments lead to higher dry strength properties. The sheet stabilization was reached more rapidly with formaldehyde than when catalyzed heat treatments were used.

Fiber Geometry as Related to Paper Bonding was described by Professor Renata Marton of the State University College of Forestry, Syracuse, N.Y. Her studies dealt with the changes in fiber structure and geometry in the case of white birch semi-chemical, cold soda pulps prepared for rheological studies. Some of these products were delignified with chlorite, thus reducing the original 19 per cent lignin to 12 and then 2.3 per cent. These pulps were then converted into handsheets using varying degrees of ball-milling and wet pressing. Fibers were examined by means of the light and polarizing microscopes, and by the use of suitable swelling techniques, changes in fiber surface and fiber walls were followed. Measurements were made indicating the extent to which the primary and outer secondary wall had been removed, so as to gain an estimate of the potential active surface of the fiber. That portion of the surface involved in bonding was gaged from cross-sections of the corresponding paper sheets, and cross-sectional changes in the fibers were also noted. Dr. Marton's talk was illustrated by means of fine-colored slides.

The Development of Bonds, was reviewed by various participants, with R. A. A. Hentschel of the E. I. duPont de Nemours & Co, serving as chairman. In outlining the **Mechanism of Bonding,** W. Boyd Campbell, consultant, in Montreal, discussed the available area, contact and hydrogen bonding. The exterior surface of the fibers, which varies from 1 to 2.3 square meters per gram, is the main source of the available area. Wet pressing gives rise to the first contact; and is aided by softening due to internal fibrillation caused by beating. Further intimate contact results from liquid internal tension on drying. In the case of hydrogen bonding, parallel orientation of the fibers is not required, but close contact is necessary. Tension during drying diminishes between those surfaces that are at right angles to the tension.

J. W. Swanson and A. Steber of the Institute of Paper Chemistry gave a paper on **Fiber Surface Area and Bonded Area.** In the case of three pulps (a coniferous bleached sulfite, a Douglas fir unbleached kraft, and a gum bleached sulfate) the linear correlation between the specific scattering coefficient and the B.E.T. nitrogen adsorption surface area was validated. The proportionality constants relating these two properties differed for each pulp, but at higher wave-lengths they approached a common value of 0.044. In other cases complications arose which the authors discussed. The absolute bonded areas (in square centimeters per gram of paper made from the pulps) were calculated from an equation and the rate of increasing tensile strength with respect to this area, decreased as the bonded area increased, when the bonded area was changed by varying the wet pressure. Apparently beating changed the bond density within this area. Tensile strength appeared to be directly proportional to the bonded area when the wet pressure was kept constant and the degree of beating was varied.

Mr. Hentschel then spoke on **Synthetic Fiber Papers and the Relation of Fiber Dimensions and Physical Properties to the Physical Properties of the Sheet.** He summarized the interrelationships of physical properties of such papers with (a) the mechanical variables, including fiber length, diameter and sheet basis weight; and (b) the physical properties of the fibers making up the sheet. He also studied the effects of fiber blends on sheet properties.

Mr. K. W. Britt of the Scott Paper Co., then took the chair, and introduced the subject of the **Role of Additives in Bonding. Fiber Attraction and Inter-fiber Bonding and the Role of Polysaccharide Additives** was the subject of a paper presented by M. L. Cushing, head of the Paper Laboratory of A. E. Staley Mfg. Co., and included the work of his collaborator, K. R. Schuman. This was a study of the degree to which six different types of additives (largely starch) were retained at different dosage levels. An attempt was also made to relate this degree of retention to increases in sheet strength. This retention was different for various types of starch, but the gains in sheet strength did not always parallel retention. The additives studied were: unmodified corn starch, thick boiling corn starch (I), a hydroxyethylated starch, guar gum (II), a mixture of I and II, a carboxyethyl starch, a carbamoyl ether of starch, and a cationic β-dialkylaminoethyl ether of starch. Their data harmonized with hypotheses advanced by others, showing that the rate of sorp-

(Continued on page 835)

Adhesives in the paper industry

Part VII (Continued) — Important adhesive forms — remoistenable adhesives*

A REMOISTENABLE adhesive is one which can be applied to a surface, dried and subsequently remain inactive until the time it is activated by moisture. Among the properties usually identified with an ideal remoistenable adhesive are:

1. Good Film Appearance—the unactivated film of adhesive on paper should be smooth and glossy.
2. Flatness—the dried film of unactivated adhesive coated on paper should not cause distortion of the paper with resulting curl.
3. Non-blocking under varying conditions of temperature and humidity, films of the unactivated adhesive should not adhere the slightest extent to other surfaces until activated.
4. Good remoistenability even after several years of aging—the adhesive film coated on paper should be readily activated after prolonged aging.
5. Good adhesion and tear strength —the adhesive film when activated should give good adhesion and tear strength to a wide variety of surfaces.

Natural gums

Natural gums have been used most widely in this field although the use of synthetic resins is rapidly expanding. Of the natural gums, various types of dextrin, starch and gum arabic are most popular. Some of the advantages of natural gums for remoistenable adhesives are:

1. Relatively inexpensive
2. Good remoistenability and aging
3. Excellent gloss

The disadvantages are:

1. Excessive curl
2. Subject to blocking, particularly at high humidity
3. Only fair tear strength and adhesion on certain types of paper when compared with synthetic resins.

As the adhesive industry has continued to improve the quality of their remoistenable adhesive, the limitations of the natural gums have become more and more apparent. With the advent of high speed machine operations in the manufacture and use of envelopes and stamps, the industry has looked towards a synthetic resin as a means of upgrading their remoistenable adhesives beyond the range possible with natural gums. Compared to the typical dextrin adhesive, a remoistenable product based upon a synthetic resin, offers the advantage of better flatness; improved blocking (particularly at high humidities); better tear strength; improved uniformity from batch to batch; and adhesion to wider variety of surfaces. Moreover, properly formulated synthetics generally will have better machining characteristics on high-speed equipment.

Synthetic resins

At first glance, the industry deferred the use of a synthetic resin for remoistenable adhesives because of the apparent high cost in relation to natural products. However, the ability to use significantly less resin adhesive with good performance, ease of compounding with low cost extenders, improved appearance and over-all increase in production rates have made the use of synthetic resins for remoistenable adhesives a real and rapidly growing field.

Synthetics are used for producing two general types of remoistenable adhesives—the 100 per cent synthetic remoistenable adhesive and the so-called resin dextrin remoistenable adhesive.

As might be expected, the 100 per cent synthetic remoistenable adhesive permits the development of all the advantages associated with a synthetic resin. However, the somewhat higher cost limits its use to those applications in which the ultimate in quality of performance is required; also, in those applications in which extreme flatness or execptional non-blocking characteristics can generally be formulated from a standard adhesive grade of polyvinyl acetate emulsion. In these specialty emulsions specific properties such as remoistenability, aging, gloss and flatness are developed through the use of polyvinyl alcohol and suitable plasticizers.

For the resin-dextrin type seal, the synthetic resin industry has developed a new type of polyvinyl acetate emulsion designed to meet the needs of the adhesive formulator by providing dextrin compatibility. The dextrin-compatible emulsions are usually polymerized by a technique which permits fine particle size distribution of the resin dispersion which improves film characteristics such as gloss and smoothness. By a judicious balance of the protective colloid and surfactant used in the emulsion polymerization, it has been possible to develop some of the remoistenable characteristics of the final adhesive in the resin emulsion as made. Finally, to provide for increased speed in machine operation and drying, the dextrin-compatible emulsion is produced at a higher-than-normal solids range of 60 per cent.

These dextrin-compatible emulsions offer ease and simplicity in formulating and very often the simple addition of dextrin and polyvinyl alcohol or dextrin itself along with plasticizer is all that is required to produce a resin-dextrin, remoistenable adhesive that has excellent characteristics.

*Prepared by Stedman C. Herman Technical Service Department, Shawinigan Resins Corp.

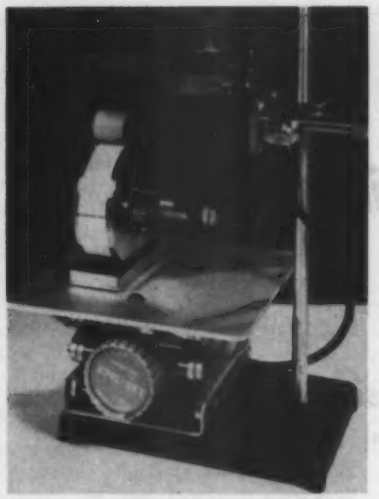


Fig. 1 — Apparatus for wet-rub test.

Measurement of wet-rub resistance of paper coatings

GLENN A. HULL

George M. Moffett Research Laboratories
Corn Products Company

STARCH-CLAY coated papers for certain applications must possess some degree of water resistance, to avoid pick in printing operations and to show a minimum of smear and rub-off when spotted with water. It has been difficult to develop a simple objective test for this so-called "web-rub resistance". By the Tappi test (1), a drop or two of water is applied to the coated paper, and this is rubbed onto a black flint surface with a minimum pressure of the index finger. The wet-rub index is the number of rubs to give the first appearance of white coating transferred to the black flint surface. Obviously such a test is highly subjective, and is only valid in the hands of an expert. W. C. Black (2) described a quantitative evaluation of wet-rub resistance, by which a disc of the coated paper was immersed in a flat dish of water, and swept in a circular path with a soft-bristle brush mounted on an arm driven by a motor. Standard pressure between the brush and paper sample was achieved by placing the dish of water on one pan of a trip balance and applying the desired weight to the other pan. Removed solids were determined turbidimetrically. While this method is unquestionably superior to the Tappi test, it still appears to have certain disadvantages:

1. The wetted paper disc tends to crinkle and warp, resulting in uneven removal of coating from the "high spots". This is easily shown by drying the paper disc and examining the density of the coating by backlighting.
2. Even with the softest badger-hair brush, the circular path shows uneven and scratchy removal of coating, apparently due to abrasion by individual bristles.
3. The stiffness of the brush is not a constant factor, since the bristles soften with use and with repeated wetting. Consequently, the brush spreads over a larger contact area with the paper. Also it is difficult to duplicate results with different brushes.
4. It is difficult to rinse all the removed coating from the brush.

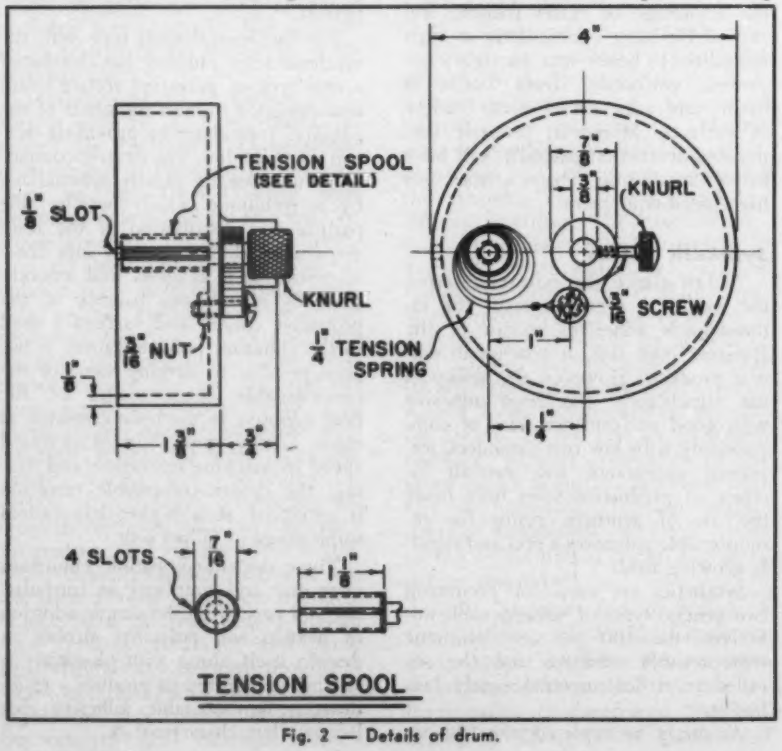


Fig. 2 — Details of drum.

The modified tester

A modified test has been devised which has greater flexibility and which avoids the inherent disadvantages of a brush. The device consists of a stainless steel drum, 4 in. dia. and 1-3/8 in. wide (see Fig. 1

References
(1) Tappi Monograph No. 17, Starch and starch products in paper coating, p. 96. New York, 1957.
(2) Black, W. C., Tappi, 32, p. 467 (1949).
(3) Hull, G. A., and Schoch, T. J., Tappi, 42, p. 438 (1959).

and 2), driven at 30 rpm by a geared-down synchronous motor. The periphery of the drum is slotted as shown. A strip of paper is wrapped around the drum, and the ends passed through the slot and locked in a tension spool. Tension is provided by a clock-spring mounted on the back side of the drum. This keeps the paper strip taut and prevents crinkling when wetted. Directly over the drum is an idler roll, 1 in. dia. and 1-1/8 in. wide, riding freely in a slotted holder. This idler is hollow stainless steel, with a threaded hole and well-fitting screw plug on one end, for loading with mercury. It is highly important that the axes of the drum and idler lie in exactly the same plane, since a skewed position will cause uneven contact and excessive rubbing action between the drum and idler roll. A piece of smooth-surfaced gum rubber tubing is slipped over the idler roll. Tests have shown that the smooth, soft rubber surface gives better duplicability in coating removal than either Tygon tubing or the bare stainless steel surface of the idler. In actual operation, there is no slippage whatsoever between the idler and the wetted paper surface, as determined by stroboscopic measurement of its speed of rotation.

For the test, a strip of coated paper is cut exactly 1 in. in width and approximately 16 in. long. This is fitted around the drum, the ends passed through the slot and looked in the tension spool. This provides an exposed test area of 12.4 sq. in. If necessary, the strip may be butt-spliced on the underside with water-resistant adhesive tape. The idler roll is then placed in position and the motor started. A small oblong pan of water is raised by means of an adjustable Lab-Jack platform until the water surface contacts the lower edge of the drum. The desired number of rotations of the drum are counted from the moment of contact of the paper strip with the water surface. The pan is then lowered sufficiently to break contact, the idler roll and drum are washed with a jet of water from a wash bottle for a period of one rotation, and the drum and ilder drained for one additional rotation. The washings are then transferred to a tared nickel dish, evaporated to dryness on the steam bath, and dried for four hours in the vacuum oven at 120°C. The removed solids divided by 12.4 gives the coating removal per square inch.

Examination of the strips on a light-box shows progressive removal of coating (i.e., decreased opacity) with increasing number of drum rotations. The coating is removed in very uniform fashion, without streaking or scratching, and without the development of light or dark patches. If any insoluble flecks are carried up on the paper strip, the idler roll rides over them without causing scratching or gouging of the coating.

Results with the new tester

Typical results on four widely different samples of commercial coated paper are given in Table I. Precision of measurements is well within required limits. Commercial double-coated papers show substantially the same removal when opposite sides of the sheet are tested, as shown in Table II. The test can likewise be used with good results on laboratory-coated papers. For example, raw stock was coated at 40 per cent solids with a No. 16 Mayer rod, and at 60 per cent solids with a trailing-blade applicator. Adhesive was a thin-boiling 80-fluidity corn starch (16 per cent based on clay) with Georgia Kaolin KCS clay. Because of the relatively light coatings applied, the weight of the idler roll was reduced to 50 g. Wet-rub tests on these coatings are shown in Table III.

In a recent publication from this laboratory (3), the structural character of free starch films was analyzed in terms of the extent and the strength of molecular association within the film. These factors were evaluated by determining the solubility of the starch film over the temperature range of 30° to 90°C. If the molecular association is both extensive and strong, the film is relatively insoluble over the entire temperature range. If association is extensive but weak, the film is insoluble at 30°C but soluble in the range of 50° to 90°C. It is of interest to note that the wet-rub resistance of clay coatings as here reported closely parallels the degree of molecular association within the starch film itself. Thus a starch which is only weakly associated in the simple film will likewise show low wet-rub resistance when used as a coating adhesive. Also, cross-bonding of the starch coating with urea-formaldehyde or acrylic resins increases both the internal bonding and the wet-rub resistance.

Table I

WET-RUB RESISTANCE OF COMMERCIAL COATED PAPERS

(90 drum rotations, 170-gram idler weight)

Paper sample	Coating weight, %[1]	Number of determinations	% Coating Removed	Standard deviation
A	25	16	20.4	±1.3
A[2]	25	24	13.6	±0.9
B	31	6	47.2	±0.9
C	33	6	38.8	±1.8
D	17	4	6.6	—

(1) Data on coating weights supplied by manufacturer
(2) 50-gram idler weight

Table II

WET-RUB RESISTANCE OF COMMERCIAL DOUBLE-COATED PAPERS

(90 drum rotations, 170-gram idler weight, determinations in duplicate)

Paper stock	% Coating removed Side A	Side B
70-lb. cover	20.5	21.9
50-lb.	21.5	21.1
60-lb.	22.9	18.7
60-lb. boxwrap	10.6	9.1
60-lb. label	7.7	8.0

Table III

WET-RUB RESISTANCE OF LABORATORY-COATED PAPERS

(50-gram idler weight, determinations in duplicate)

Mode of application	Coating weight, %	Rotations	% Coating removed
No. 16 Mayer rod, 40% solids	20	180	13.0
No. 16 Mayer rod, 40 % solids	20	90	10.2
Trailing blade, 60% solids	6.7	30	13.4
Trailing blade, 60% solids	6.7	90	23.8
Trailing blade, 60% solids	9.1	30	20.5
Trailing blade, 60% solids	9.1	90	34.2

Selectifier screen

(Continued from page 777)

such that it creates a negative pressure at the trailing edge as it rotates within the cylinder. As the bar passes a hole, it pulses and pulls fibers and rejects away from the face of the screen. At the same time it forces these materials downward toward the volute section at the bottom of the screen interior. Extensive laboratory and field trials have shown that 300 to 350 rpm. in a 24-in. dia. cylinder is best for most paper mill applications.

Reject system

The reject system, which consists of two parts, removes the heavy and light objectionable materials. These rejects are forced downward continuously within the cylinder to the volute area. Here the heavy materials are removed by dropping into a 3-in. dia. opening adjacent to the bottom of the volute. These rejects settle into the trash box and are periodically removed through a quick-opening door. The light rejects continue past the 3-in. dia., heavy reject opening to the 3-in., V-notched slide valve. This valve, as stated previously, can be either handwheel-operated for a continuous bleed, or pneumatically actuated by a control panel for continuous bleed with a periodic purge.

When the reject line is purged, the valve opens momentarily and immediately returns to the pre-set opening which governs the rate of the continuous bleed. The purge eliminates any possibility of rejects plugging the reject line behind the valve. The control panel can be set to purge the screen at any predetermined interval from once every 20 min. to as many as four times every minute. Single control panels are available to centrally control multiple screen units up to 10 screens. A cam-type stepping switch is provided in the panel for sequential operations of the purging systems on a multiple screen installation.

Drive mechanism and typical hookups

A heavy-duty, directly-driven spiral bevel, gear drive, proved to be very successful on other Selectifier screens of the series, has been made standard equipment on the 12-P. This drive will assure low cost, trouble-free operation and long life.

The minimum pressure required for the operation of the 12-P is approximately 5 psi. This pressure takes care of the pressure drop across the unit and insures that the screen is full at all times. Additional pressure will be required to take care of any subsequent head requirements beyond the screen.

Fig. 3 shows a typical vat hookup for a Selectifier screen when a centrifugal cleaner is used. In this case, the centrifugal cleaner is a Liquid Cyclone. Stock and white water are introduced at the suction side of the pump. Here the water and stock are mixed and pumped to the Liquid Cyclone which removes the high specific gravity material (such as fine sand, scale and grit). From the cleaner, the stock passes to the Selectifier screen where light rejects (such as a fiber bundles, shives, plastics, etc.) are removed. In addition, the Selectifier screen insures that the accepted fibers leaving the unit are completely dispersed or deflocculated—which is inducive to a more uniform and more evenly formed sheet.

Fig. 4 illustrates a Selectifier screen hookup on a fourdrinier. Here again the water and stock are mixed at the suction side of the fan pump. From the pump, the stock goes to the screen and on to the fourdrinier headbox.

Selectifier screen installations vary to suit different mill conditions. We have installed screens in basements, on operating floors and on mezzanines. Numerous piping arrangements also have been used to make a screen installation compatible with the type of equipment of an existing system.

Screens for all capacities

The 30-P and the 36-P are used primarily in mills having wide, high-speed paper machines, and in pulp mills for high-consistency screening. The capacity of the 30-P is one and one-half to two times that of the 24-P. The 36-P will handle approximately two and one-half to three times the capacity of the 24-P.

Use of pipe . . .

(Continued from page 773)

adapters may be welded to the Schedule 10 pipe. Valves should be all stainless steel. Pumps should be of the end-suction type and of all stainless steel construction.

The hydrogen peroxide, sodium hydroxide, sodium silicate and magnesium sulfate solutions must be metered to mix the desired peroxide bleach solution. This may best be accomplished with the positive displacement type of pump. An economical and satisfactory arrangement is a multiple pumping unit consisting of a pump for each component of the solution all driven from a single drive and with an adjustable stroke on each pump. The pumps should be of stainless steel or other high alloy.

The prepared peroxide bleach solution should be handled in a system of pumps, piping and valves of all type 316 stainless steel.

Chlorine dioxide making and handling

The majority of chlorine dioxide produced by pulp and paper mills in this country is manufactured by either the Mathieson or the Solvay process. As far as piping, valves and pumps are concerned, the two processes are similar. The Mathieson process requires the handling of concentrated sulfuric acid, sodium chlorate solution, sulfur dioxide gas, chlorine dioxide gas, chlorine dioxide solution, and waste acid. The Solvay process requires the handling of concentrated sulfuric acid, sodium chlorate solution, methanol, chlorine dioxide gas, chlorine dioxide solution and waste acid. The use of sulfur dioxide or methanol for the reduction of the sodium chlorate is the principal difference between the two processes.

Sulfuric acid at about 66 degrees Baume is used, and may be handled in carbon steel pipe. Schedule 40 pipe may be used for sizes 1½ inch and smaller. Schedule 80 pipe should be used for sizes above 1½ inch. Fittings should be butt welded steel of the same wall thickness as the pipe. All joints should be welded or flanged. Blue African asbestos gaskets 1/16 inch thick should be used on flanged joints. Cast iron flanged Saunders patent diaphragm valves with Teflon diaphragms give satisfactory service. Pumps should be cast iron, stainless steel fitted.

Sodium chlorate solution may be handled in Schedule 40 carbon steel pipe made in accordance with ASTM A-53 or A-120. All joints should be welded or flanged. Flanged joints should be limited to those points required by flanged valves or equipment. Red rubber gaskets are satisfactory for sodium chlorate service. Fittings should be carbon steel butt welding or 2000 lb. forged steel socket welding types. Valves should be forged or cast carbon steel with stainless steel trim. Where a small screwed valve is used, the screwed joints should be seal welded.

Sulfur dioxide gas used in the Mathieson process may be purchased in liquified form or may be obtained by burning sulfur. Liquid and gaseous purchased sulfur dioxide may be handled as described above for purchased chlorine. The handling of sulfur

burner gas will be discussed later.

Chlorine dioxide gas from the reactor to the absorption tower may be handled in resin bonded fiberglass, glass, glass lined steel or polyvinyl chloride pipe and fittings.

Chlorine dioxide solution may be handled in Saran-lined steel, polyvinyl chloride-lined steel or polyvinyl chloride pipe and fittings. Saran lined flanged cast iron Saunders patent diaphragm valves with Kel-F diaphragms are satisfactory for their service. Centrifugal pumps of the single suction type of glass-lined cast iron or of alloy similar to Worthite give satisfactory service.

Methanol may be handled in carbon steel pipe made in accordance with ASTM A-53 or A-120 of Schedule 40 wall thickness. Joints may be screwed, welded or flanged. Screwed fittings may be 125 lb. cast iron for sizes 2 inch and smaller, or 2000 lb. forged steel screwed fittings may be used. Butt welding steel fittings of the same wall thickness as the pipe may be used. Flanged fittings may be 125 lb. cast iron. Valves may be 125 lb. all bronze with screwed ends for 2 inch and smaller and 125 lb. cast iron bronze trim flanged for larger sizes. Pumps may be cast iron bronze fitted single-suction centrifugal type.

Waste acid may be handled in Saran-lined steel, polyvinyl chloride-lined steel or polyvinyl chloride pipe and fittings. Valves may be Saran-lined flanged cast iron Saunders patent diaphragm valves with Teflon diaphragm.

Sulfur dioxide making and handling

Where sulfur is burned to produce sulfur dioxide, the sulfur dioxide is handled in a moist condition. This requires the use of Saran-lined steel, lead-lined steel, polyvinyl chloride-lined steel or polyvinyl chloride pipe and fittings. Valves may be Saran-lined flanged cast iron Saunders patent diaphragm valves with Telflon diaphragm. These same materials are satisfactory for sulfur dioxide solution in water for use in a sulfur dioxide bleach stage where a solution may be used or where sulfur dioxide is used as an antichlor.

Nomograph for lime bleach liquor

D. S. DAVIS

Head, Department of Pulp and Paper Technology
University of Alabama

DATA that specific gravity, temperature, and concentration of available chlorine in lime bleach liquor, as given by the Solvay Sales Corp., can be correlated by means of the expression.

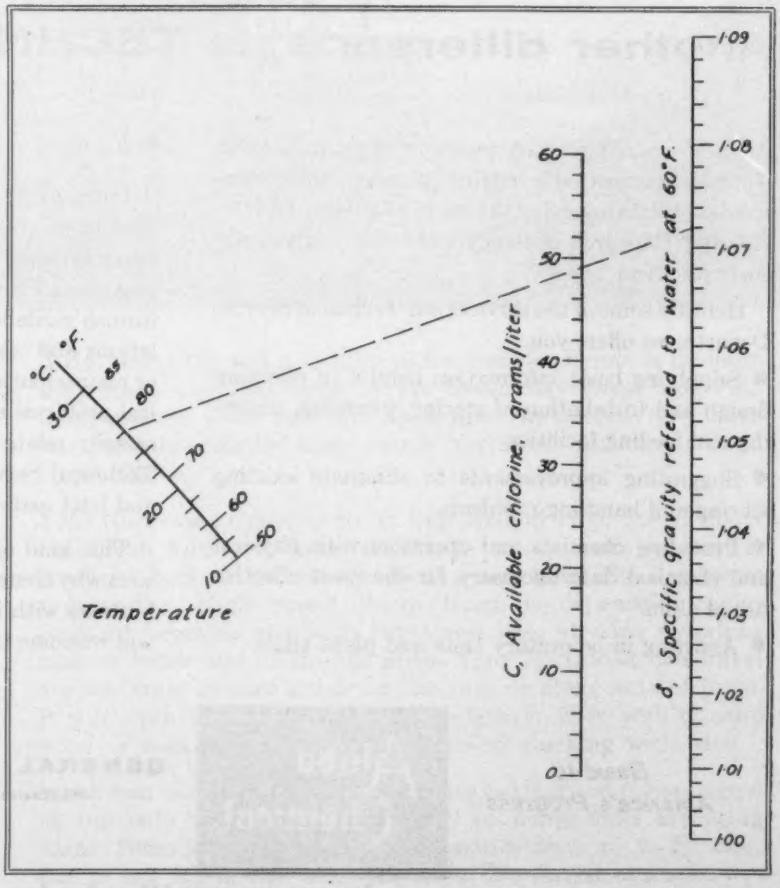
$$C = a + b\delta^{3.008} - 1$$

where C = concentration of available chlorine, grams per liter

δ = specific gravity, referred to water at 60° F.,

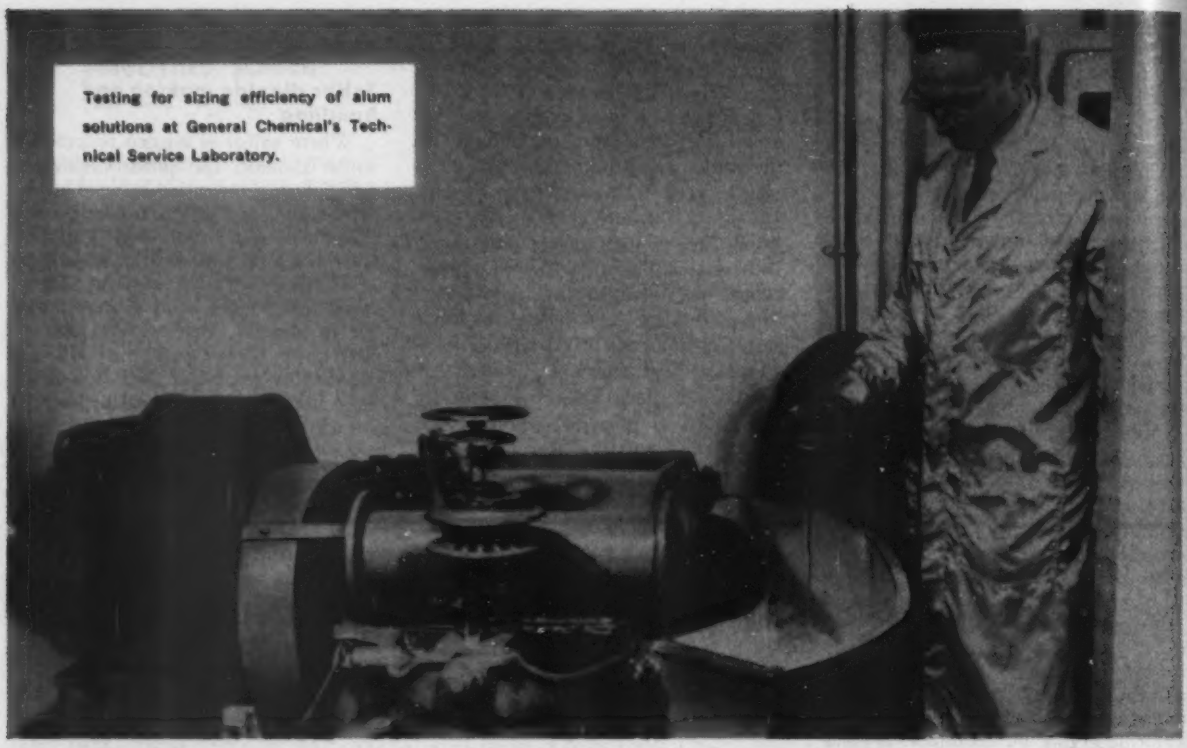
and a and b depend upon temperature.

This equation can be solved readily and accurately by means of the accompanying line coordinate chart, which was constructed through recourse to well-known methods (1). The use of the chart, which greatly extends the utility of the original tabular data, is illustrated as follows: What is the concentration of available chlorine in a sample of lime bleach liquor that exhibits a specific gravity, referred to water at 60° F., of 1.072 at 26° C? As shown by the broken line, connect 26° C. on the temperature scale and 1.072 on the δ-scale with a straight line and note the intersection with the C-scale at the desired value, 49 g. of available chlorine per liter. At 70° F., what is the specific gravity of a sample of lime bleach liquor that contains 17 g. of available chlorine per liter? Project a straight line (not shown) from 70° F. on the temperature scale through 17 on the C-scale to the δ-scale and read the desired specific gravity as 1.028.



Literature Cited

(1) Davis, D. S., "Nomography and Empirical Equations," Chap. 10, New York, Reinhold Publishing Corp., 1955.



Testing for sizing efficiency of alum solutions at General Chemical's Technical Service Laboratory.

Another difference in GENERAL CHEMICAL ALUM is TECHNICAL SERVICE

As the country's primary producer of alum, General Chemical is constantly helping customers solve technical problems involving the use of aluminum sulfate. Results? Improved efficiency and reduced operating costs for them.

Here are some of the services our Technical Service Department offers you:

- Supplying basic information helpful in planning design and installation of storing, pumping, metering and feeding facilities.
- Suggesting improvements to eliminate existing storing and handling problems.
- Providing chemists and operators with physical and chemical data necessary for the most effective use of alum.
- Assisting in laboratory tests and plant trials.
- Running check analyses in our own laboratories.

In the paper mill, our specialists advise on the most efficient use of aluminum sulfate for a particular mill's requirements. They can provide assistance on the important conversion from dry to liquid alum, and furnish guidance on the proper design of new installations and selection of materials to avoid handling or maintenance problems. In many instances, chemical problems arise in operations which are not necessarily related to alum. At such times, General's Technical Service continues to offer helpful advice and lend assistance whenever possible.

This kind of Technical Service is one of the reasons why General Chemical is a good company to do business with for *your* mill's alum requirements. We will welcome the opportunity to serve you.

Basic to America's Progress

Allied Chemical

GENERAL CHEMICAL DIVISION
40 Rector Street, New York 6, N. Y.

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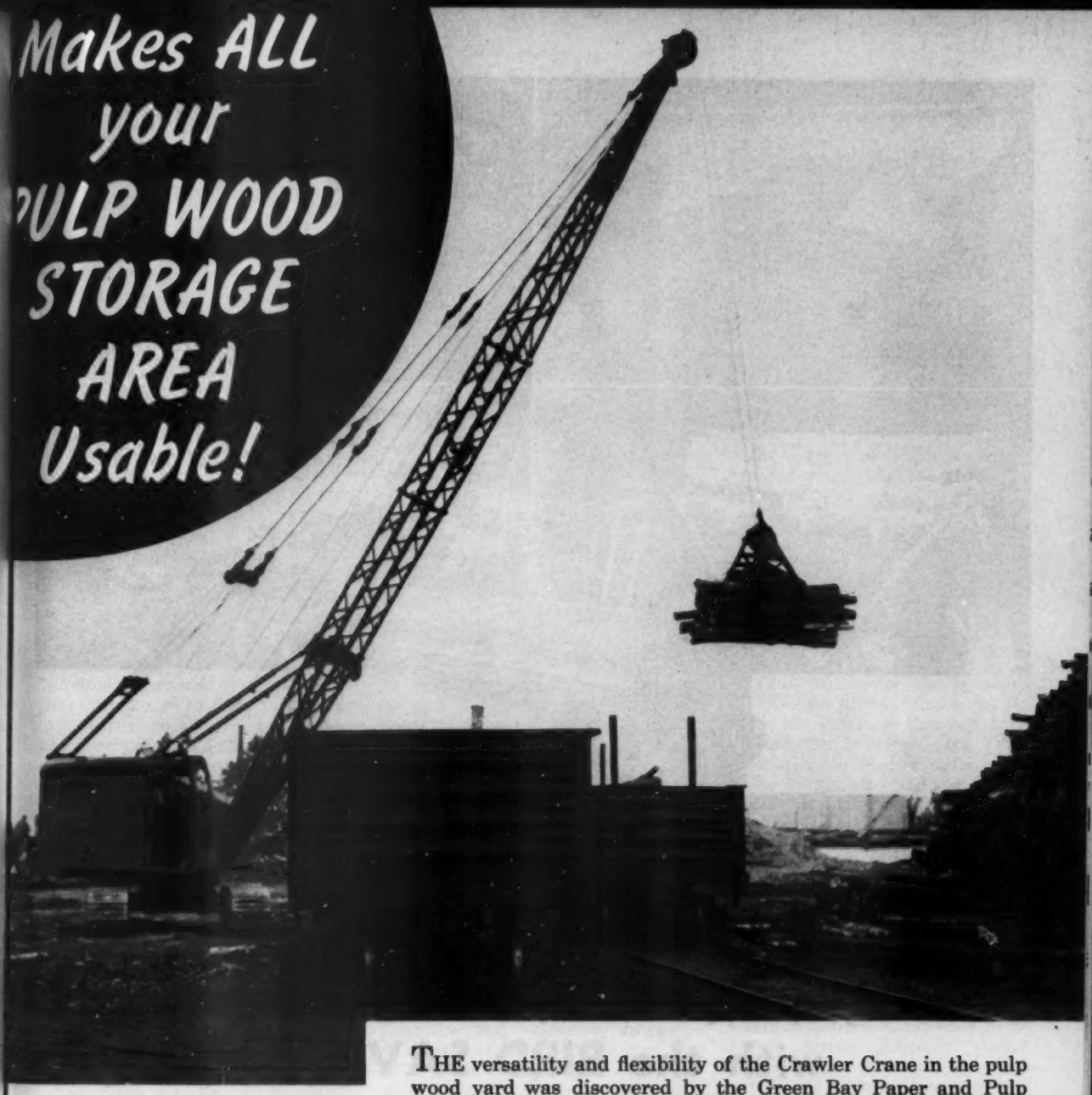
Makes ALL your PULP WOOD STORAGE AREA Usable!



THE versatility and flexibility of the Crawler Crane in the pulp wood yard was discovered by the Green Bay Paper and Pulp Company ten years ago with their first Northwest. They have just recently installed their fourth Northwest machine, a 25-D ¾ yd. Crane.

Your Northwest Crane, with its Independent High Speed Boom Hoist, can work into areas feeding to trucks, belts or cars. It can work back out of areas unloading as it goes. The Northwest Independent High Speed Boom Hoist is dependable under constant booming and, with Northwest easy steering Crawlers, assures better use of storage areas. Your Northwest can travel a whole train of cars either on the cars or along side of them. It will work in narrow aisles and pile to a 40-ft. wall of pulp wood or feed into or out of jack-strawed stacking with ease.

Northwest versatility and mobility means time and money saved in any pulp wood yard. That's why so many mills are using them. There is a wide range of capacities from 13 to 50 tons. *Let us tell you of the many successful Northwest operations in paper mills, both large and small. A Northwest man will be glad to tell you about Northwests' many advantages.*

CRANES
SHOVELS
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3/4 to 3 Cu. Yd. Capacity

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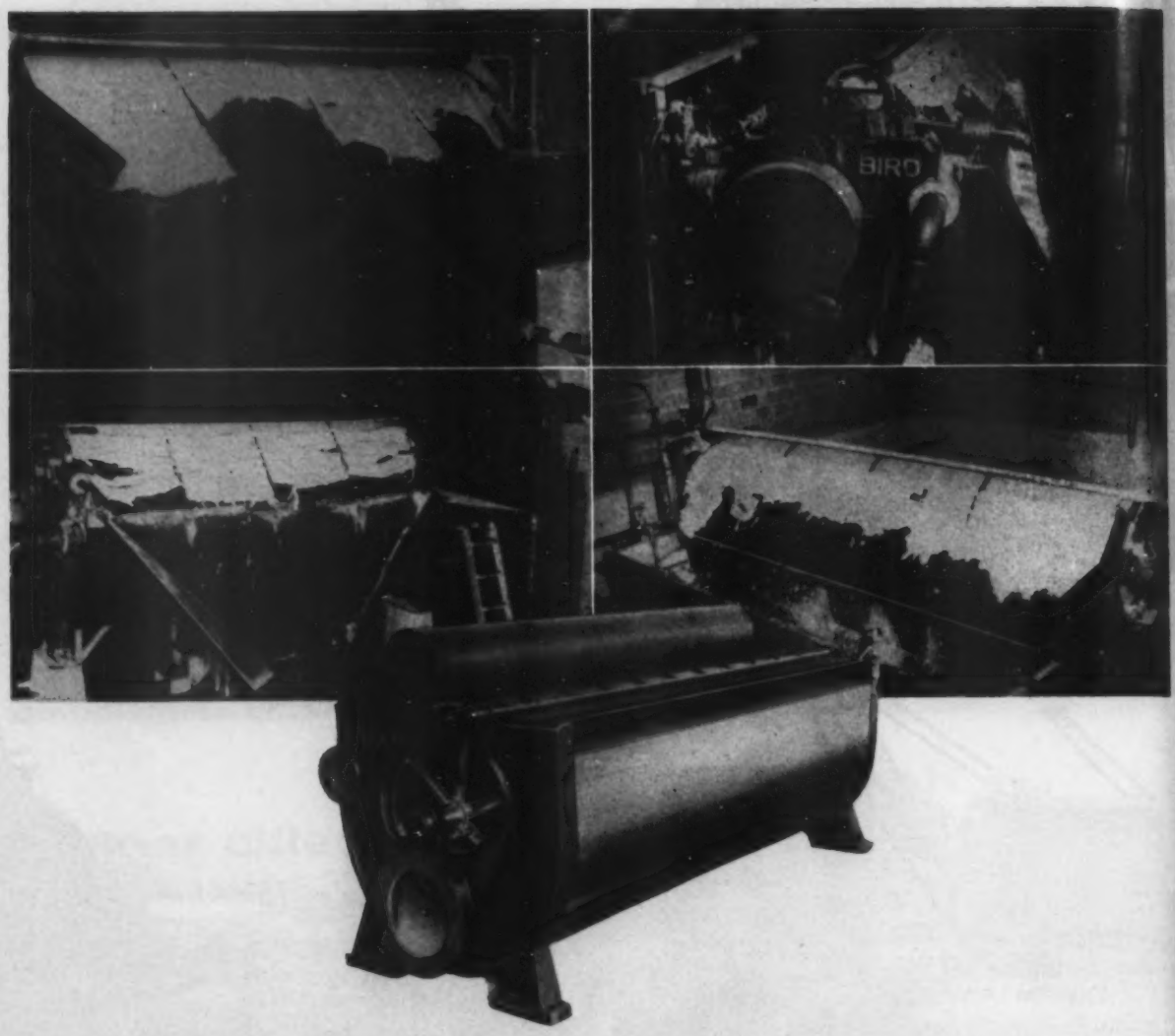

Employ Simple Gravity To Bring Costs Down
with the BIRD SAVE-ALL

Here is the simplest, surest, least expensive way to recover valuable fibre and filler from waste water.

Using gravity as the separating force, the Bird Save-All delivers the recovered stock directly to the Machine chest and puts the water in shape for re-use, too—at lowest cost.

Let us show you how quickly a simple, practical Bird Save-All system can turn a loss into a profit in your mill.

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CURRENT COMMENTS

View of expansion experience — Free trade zone treaty to be signed

WARREN B. BULLOCK

When the nation's paper manufacturers gather in New York this month for their annual Paper Week they will find their industry in the middle of a three-year expansion program of greater magnitude than experienced in any previous three years of its history. The total investment in additional capacity will be barely short of one billion dollars. The 1959 production of approximately 34,000,000 tons is an increase of 10 per cent over 1958 and 8 per cent above the previous high record set in 1956. Expansion in the newsprint industry is inconsequential for the three-year period, but newspaper demand is rapidly cutting down the surplus in existing production capacity.

Among paper industry economists an accepted rule of thumb formula to calculate building costs is that every ton of added daily capacity means a capital expenditure of $125,000 and each daily ton in pulp capacity represents an investment of $70,000.

The calculation of expenditures during the three-year period is based on a detailed survey by the major paper, paperboard and pulp associations which shows the following increases in daily capacity: In 1959 the daily normal capacity increased from 117.12 thousand tons in 1958 to a new total of 120.92 thousand tons. In 1960 the scheduled increase is to 123.29 thousand tons and in 1961 to 125.39 thousand tons.

Computed on the above cited formula, this expansion results in the following increases in capital investment: 1959—$475,000,000; 1960—$296,250,000; and 1961—$262,500,000. These estimates are confirmed by a joint statement by the Department of Commerce and the S.E.C. which list the dollar value of capital investment in 1959 as $640,000,000 for paper and related products, but $475,000,000 for paper and paperboard alone. Even these figures are far below some individual estimates by various paper company leaders.

As the year 1959 drew to a close, the following were some of the major expansion projects announced, and not included in the official industry expansion survey: Noralyn Paper Mills at Baton Rouge, La., $20,000,000; St. Regis Paper Co., $30,000,000 in the Pacific Northwest; Mead Corp. and Inland Container Corp. jointly in a new kraft mill at Rome, Ga., at a cost of $30,000,000; Scott Paper Co., $10,000,000 for expansion at Mobile, Ala.; and International Paper Co. for a new machine at its Arkansas mill at a cost of $13,000,000.

When the recession developed in the 1956-57 period, plans for new construction to cost $200,000,000 were canceled or deferred. With the industry reaching a production rate of over 100 per cent of rated capacity in 1956, production dropped to a ratio of 80 to 90 per cent in 1957. With 1959 production achieving a ratio of well over 90 per cent of capacity it has seemed opportune to many companies to take up the lapse in the industry's normal growth in addition to projecting future building at the usual average, 4 per cent rate of annual increase.

Some paper industry leaders on the one hand are expressing fear that the industry is once more reaching toward an unprofitable excess capacity status, and on the other hand are authorizing large expenditures on behalf of their own companies.

The manner in which the paper industry has recovered from the 1956-57 period is shown below by graphic comparisons of Wall Street quotations for the securities of some of the leading companies, shown in round figures:

Free trade zone treaty

Under Secretary of State Douglas Dillon is participating actively in an effort to bridge the economic and political division in Europe between the European Common Market and the European Free Trade Association, commonly referred to as the "Inner Six" and the "Outer Seven" nations. Canada is also represented as an observer at the conference in mid-January. The most serious rivalry is between France and Great Britain. Mr. Dillon is not a member of the conference of heads of government considering the problem but is attending as an observer. Meanwhile the Free Trade Zone treaty to provide economic and industrial integration in seven South American nations is expected to be signed during February. Other Latin-American nations may be admitted later upon agreement to participate in mutual traffic rate reductions.

Map paper problems

Problems of production of map paper for the armed services was

WALL STREET QUOTATIONS OF SECURITIES FOR 1958-59 PERIOD

Company	Jan. 1, 1958	Jan. 1, 1959	Jan. 1, 1960
Champion	35	42	41
Crown Zellerbach	44	59	53
International	86	120	136
Kimberly-Clark	47	65	71
Mead	35	46	49
St. Regis	37	44	54
Union Bag	33	43	45
West Virginia	37	47	56

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The World's Foremost and Largest Manufacturer of SYNTHETIC CONTENT DRYER FELTS

All Scapa Long-Wearing Synthetic-Content Dryer Felts now in production are protected by *Patent Applications* in all papermaking countries of the world, and their manufacture and supply are *exclusive* to the SCAPA ORGANIZATION and its LICENSEES.

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★ **DACRON-NYLON DRYER FELTS,** 100% synthetic-content

All Scapa synthetic-content dryer felts are electrostatically neutral.

- Steam Economy
- Longer Life
- Dimensionally Stable
- Lower Cost Per Ton

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John B. Chandler Co.
1935 OCEAN FRONT, ATLANTIC BEACH, FLA.

Tipka Supply Company
415 JACKSON ST., OREGON CITY, ORE.

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Current Comments . . .

the subject of a conference between representatives of nine paper companies and army officials at the headquarters of the U.S. Army Quartermaster Research and Engineering Command at Natick, Mass. Problems discussed were specifications for such paper, quality standards and other similar questions involved in producing maps for use in military operations.

Financial report

Enthusiasm among securities buyers forged upward on the reports of the settlement of the steel strike, but as January advanced into its second week there were periods of heavy selling which to a limited extent affected paper mill securities.

Stock and Bond Quotations

New York Stock Exchange — Stocks

Closing Prices	Jan. 11, 1960	Dec. 10, 1959
American Can	42¾	42¾
Same Pref.	36	36¾
Celotex	34	33¼
Same Pref.	19	18½
Certain-Teed	13⅜	13
Champion P & F Co.	41¼	44
Same Pref.	* 88-88½	90¼
Chesapeake of Va.	40½	42
Container	27¼	28½
Same Pref.	* 82-82½	82
Continental Can	46½	47
Same Pref.	* 76-77	77
Crown Zellerbach	52⅛	56½
Same Pref.	87½	87½
Diamond National	33⅜	37¼
Same Pref.	28	* 29-29⅜
Federal Paperboard	42	44½
Same Pref.	* 21⅛-21¾	21½
Fibre Paper Board	45¾	47¾
Great Northern	51	50¾
Hammermill	* 32-32½	31½
International	132	135½
Same Pref.	* 86½-87	* 86½-89
Kimberly-Clark	68	71
MacAndrews & Forbes	* 28¼-29½	30¾
Masonite	36½	36
Mead Corp.	47¾	47¾
Same Pref.	* 87¼-88½	* 86½-87½
Minnesota & Ont.	32½	33⅜
Oxford Paper	30¼	31¾
Same Pref.	82	86½
Rayonier	26¾	25½
Riegel	41⅞	43
St. Regis	50¼	53¾
Same Pref.	88	* 91⅜-94½
Scott	78⅞	79¼
Same $4 Pref.	83	* 84-86
Same $3.40 Pref.	39¼	* 74¾-75½
Sealright	34⅜	41¼
Standard Packaging	* 74-76	36½
Same $1.60 Pref.	*100-110	*106-112
Same $1.20 Pref.	39	41¼
Union Bag-Camp	40¼	44
United B & C	26	26⅜
U. S. Gypsum	92¾	94
Same Pref.	*151½-153	*151-153
West Va. P & P	53¼	56½
Same Pref.	* 93-95	* 93⅞-95¼

New York Stock Exchange — Bonds

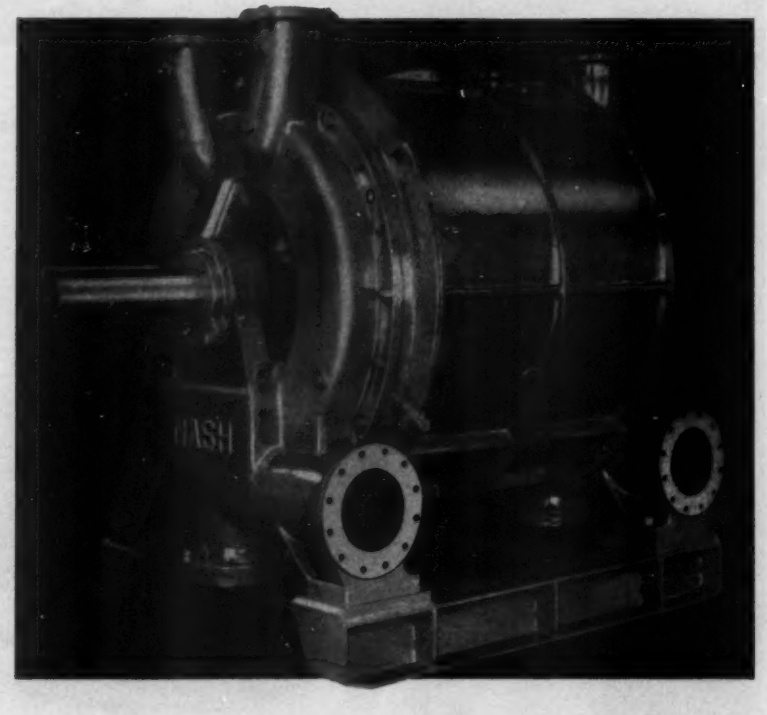
Champion P & F 4½%	111¾	111¼
Champion P & F 3¾%	82	82
Diamond Gardner 4%	—	89½
Kimberly-Clark 3%	87	89½
Oxford 4¾%	108	111
Scott 3%	103¾	104

American Stock Exchange — Stocks

American Writing	31¼	32
Allied Paper	15⅝	14½
Brown Co.	11⅝	11½
Puget Sound P & T	25	25⅜

*Closing Bid and Asked Prices.

Just 3 days lost production of a Paper machine can cost more than the vacuum pumps. That makes dependability the essential factor in pump selection. No pump is more dependable than a Nash



Over a thousand leading mills depend on Nash Vacuum Pumps to insure uninterrupted production. Nash Pumps are built to stand the pounding of continuous operation. They are simple. They have no internal parts in wearing contact. They will handle slugs of water or stock. They are designed to operate at the low speeds necessary for long life and reliability. Don't gamble with your production. Install Nash Vacuum Pumps and be safe.

The new Nash 5308-A shown above, has four separate suction inlets, each of which functions independently of the others. This offers the machine operator great flexibility, since these may be used in any desired combination to produce a variety of capacities and vacuums.

NASH ENGINEERING COMPANY

SOUTH NORWALK, CONN. U. S. A.

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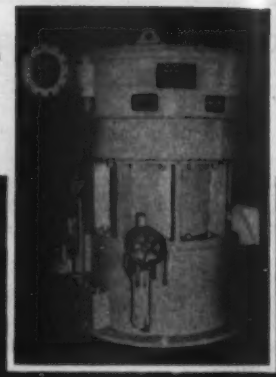
For primary refining at low power...

New Jones Vertiflex



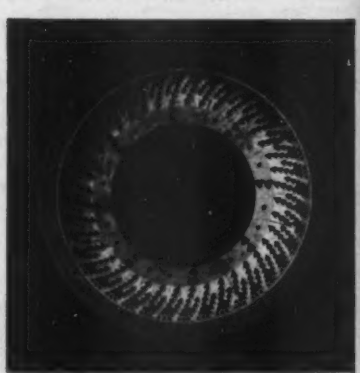
Vertiflex requires minimum floor space. Available in two disc sizes — 48" (shown here) and 34".

Typical application..... Chip Shredding

High quality pulp with extremely low waste and fibre damage, substantial savings in alkali used, increased yield, decreased screen rejects and lower recovery system loading — those are the results from this efficient Jones Vertiflex chip shredding installation. And energy required to process more than 2000 B.D. tons per day is just over ¼ HP days per ton!

Full size chips are fed to the Vertiflex by belt conveyors from two chip silos. Resulting "shreds" are as long as the original chips, but greatly reduced in cross section.

Other applications on which the Jones Vertiflex will perform with outstanding efficiency include cold caustic chips, high yield pulps, bagasse, high density bleaching and denoodling. For full details write to E. D. Jones Corporation, Pittsfield, Mass.



Teeth in vertically mounted rotating disc inter-mesh with teeth in opposing stationary plate mounted in Vertiflex cover. Clearance is easily adjustable and disc life is high since there is never any metal-to-metal contact. Teeth shape and arrangements are varied to fit the application.

E. D. JONES CORP. · PITTSFIELD, MASS. · member BELOIT group

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Jones

PULP MILL EQUIPMENT AND
STOCK PREPARATION MACHINERY

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NEWS of the INDUSTRY

Future Looks Bright for Molded Paper Products

The trend to paper service use and self-service stores has affected the manufacturing of molded paper products.

The year of 1959 added another year of sales growth for Keyes Fibre Co. of Waterville, Me. H. Douglas Archibald, vice president in charge of sales stated: "There is every reason to expect both trends to continue".

Products affected by the trend were Keyes' Chinet packaged paper plates and Sho-Pak prepackaging trays.

"Another area of development in the past year, which also has good potential for the future, is in the production of molded pulp articles for the packaging of agricultural products and fragile industrial articles," added Archibald.

SPMRL Approves Budget for Research Funds

A budget of $163,500 has been approved by the Sulphite Pulp Manufacturers' Research League at the Institute of Paper Chemistry for research on stream improvement and utilization of sulfite pulping byproducts.

Stanton W. Mead, league president and president of Consolidated Water Power & Paper Co., told the group that 1959 has shown "more substantial progress on spent sulfite liquor processing and utilization than we have been able to report for some time. The League's years of fundamental research are paying off".

Mead also stated that United States mills producing 20 per cent of the sulfite pulp are equipped for spent liquor utilization and next year the figure will rise to 25 per cent or more.

New Headquarters for TAPPI

TAPPI has moved to new and expanded quarters at 360 Lexington Avenue, New York City. The new headquarters provides more facilities than were available at the headquarters located at 155 East 44th Street.

The growth of TAPPI in recent years, from a membership of 2900 in 1945 to 4600 in 1950, and an estimated membership of more than 10,000 by early 1960, dictated this expansion. The association has members in 55 countries, with 14 sections in the U.S. and one section in Europe.

Two Michigan rivers to get Health Examination

Nature's own method of fighting river pollution will be the object of a three-year investigation to be conducted by the University of Michigan School of Public Health.

The United States Public Health Service has approved a three-year grant of $52,669 to support the study. Scientists are planning an intensive "health examination" of two Michigan rivers. From their findings, they

Filter Plant Built to Remove Radioactive Contaminants

Knowlton Brothers of Watertown, N. Y., is installing a special giant filter tank to remove radioactive contaminants from the company's process water which is drawn from the Black River.

David C. Knowlton, president, stated that radioactive fallout from atomic and thermonuclear bomb tests, both in this country and in Russia, can contaminate the river water to an extent that makes it unusable for manufacturing certain special papers used by manufacturers of light sensitive photographic material. Although, he added that the amount of radioactivity involved was extremely minute and was in no way harmful to human beings.

The necessity for removing this almost undetectable amount of radioactivity is brought about by the fact that the special papers used for packaging photographic materials are in prolonged contact with the photo-sensitive materials (up to two years) and that the defects in the films could result if even the most minute amounts of radioactivity were present in the paper.

The new filter tank which is 50 ft. in diameter and 15 ft. deep, is being installed behind the main plant, next to the Black River.

Water continually flows through the tank (which holds 180,000 gal. of water during the process) as chemicals (alum and powdered clay) are added to it. The chemicals

precipitate impurities out of the water. In this fashion, any radioactive particles present are removed. The filter facility can purify 1,000,000 gal. of water per day when operated on a 24-hr. basis.

hope to aid the natural self-purification process.

Associate Professor John J. Gannon of the U-M School of Public Health will direct the investigation. He will be aided by state and local health officers, research assistants and U-M graduate students.

UM to Sponsor Summer Program

A Summer Institute of the Pulp and Paper Industry at Maine will be sponsored by the University of Maine Pulp and Paper Foundation.

The courses offered will be available to employees of pulp and paper mills and allied industries throughout the country. The dates are July 11 to July 29 and August 1 to August 19.

The following men have been selected to participate in the Summer Institute as visiting professors: Professor C. E. Libby of North Carolina State; Professor F. W. O'Neil of Syracuse; Professor John Lewis of Lowell; Dr. A. H. Nadelman of Western Michigan; Dr. Roy P. Whitney of the Paper Institute.

1960 Bolton Contest Ends March 31

All entries to the 13th annual Bolton Award Essay Contest must be postmarked before midnight March 31, 1960, and mailed to the Secretary and Treasurer, Paper Industry Management Association, 10 North Clark Street, Chicago 2.

The subject of this year's contest, "Through the Grapevine", was selected because of universal interest in the effects of "the grapevine" to which nearly everyone has been exposed at one time or another. Papers may be as general or specific as entrants wish in their comments on "Grapevine" advantages or disadvantages, benefits or detriments.

Papers should be confined to 1500 words, typed with double spacing on one side only and on plain sheets, 8½ in. by 11 in. Cover sheets only are to include the author's name, home address, job title, name and address of the mill.

The Paper Industry Management Association and John W. Bolton & Sons Inc., co-sponsors of the contest, have announced that 10 national cash prizes will be awarded: First prize, $1000; second prize, $750; third prize, $500; and seven prizes of $200 each.

Langston Holds Seminar in Corrugated Container Production

A week-long seminar in corrugated container production and quality control for adhesive and board sales engineers and trouble shooters was conducted recently by Samuel M. Langston Co. at its plant in Camden, N. J.

The seminar, third of a series, was under the leadership of Langston's chief supervisor, Bill Schroeder. The meeting covered operation and adjustment of single facers, glue machines, double facers, steam systems and preheaters and preconditioners.

Quality and waste control discussions covered such conditions as looseback, low caliper, fracturing, high-low and leaning corrugations, blisters, finger lines, erratic glue pattern, etc.

Columbia River Changes Address and Names

Since February 1, 1960, the executive offices of Columbia River Paper Co. have been located at: 1121 S. W. Salmon St., Portland 5, Ore.

Columbia River has also announced that it has changed the names of its various divisions. Here are the changes: Oregon Pulp & Paper Co., Paper Division, Salem, Ore., will now be—Columbia River Paper Co., Oregon Pulp & Paper Division.

Columbia River Paper Mills, Vancouver, Wash., will now be—Columbia River Paper Co., Vancouver Division.

Oregon Pulp & Paper Co., Lumber Division, Salem, Ore., will now be—Columbia River Paper Co., Lumber Division.

Corn Products to Send Large Group to TAPPI Meeting

A large group of technical men will be representing the Corn Products Sales Division throughout the annual TAPPI and APPA conventions in New York this month. Corn Products are cordially inviting delegates to visit the company's open house — Club Suite, third floor, Hotel Commodore.

Pulp and Paper Program is Popular With Students At Miami University

A pulp and paper program was launched two years ago at Miami University in Oxford, Ohio. This new subject in the University's curriculum began with a freshman class of 14 students and this year has shown its popularity by having three classes of students totaling 35.

This year the program has opened its own new pulp and paper building. This building houses complete laboratories with testing equipment unique to the industry, a library and model papermaking machinery.

The program is a joint venture of the Ohio paper industry and the Miami Chemistry Department. Companies in Ohio and other states donated much of the laboratory and workshop equipment.

Dusenbery to Represent Textile Paper

The John Dusenbery Co. Inc. of Verona, N. J., has been appointed exclusive sales representatives by Textile Paper Products Inc. of Cedartown, Ga., for their entire line of core cutters. The territory will include the United States and Canada.

Ownership changes

Eureka Specialty Printing Co. of Scranton, Pa., has purchased *Pee Cee Tape & Label Co.*, converters of pressure-sensitive labels and tapes, which is located in Los Angeles. As a division of Eureka, Pee Cee will continue to operate under its own name, with production facilities remaining on the west coast.

Union Bag-Camp Paper Corp. is exploring with the *River Raisin Paper Co.* of Monroe, Mich., in a plan for merging River Raisin into the Union Bag-Camp Paper Corp.

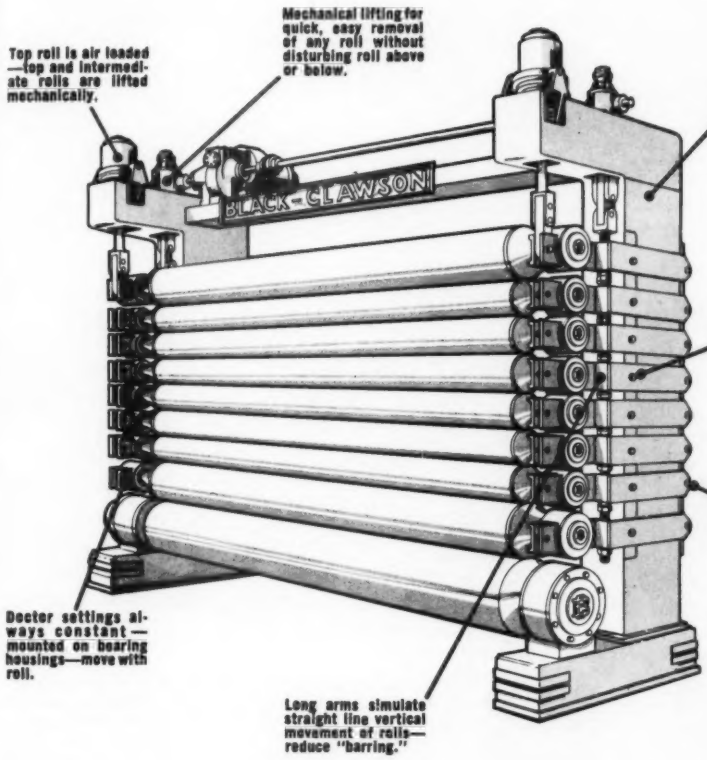
Federal Paper Board Co. has arranged to acquire the *Manchester Board & Paper Co., Inc.* of Richmond, Va. Major stockholders of Manchester have already agreed to the merger. Manchester will continue under its present management as Manchester Board & Paper Division of Federal.

The merger of *Kalamazoo Vegetable Parchment Co.* and *Sutherland Paper Co.*, both Michigan corporations, into *KVP Sutherland Paper Co.* a Delaware corporation, was approved by the shareholders of each company on December 18, 1959, and was formally consummated on January 4, 1960.

Arrangements are being made by *Consolidated Paper Corp. Ltd.* to complete the purchase of certain assets from *St. Regis Paper Co. (Canada) Ltd.* These assets include all the latter's multiwall bag and packaging system manufacturing facilities in Canada. Consolidated proposes to incorporate a new company under the name of *St. Regis-Consolidated packaging Ltd.* This new company will carry on the manufacturing operations of St. Regis Paper Co. (Canada) Ltd., with plants in Vancouver, B.C., Dryden, Ont., St. Lambert and Cap de la Madeleine, Que.

Field Enterprises Inc. has completed the purchase of the *Manistique Pulp & Paper Co.* of Manistique, Mich. Operations will continue unchanged with the continuing production and experimentation in a flotation

Advanced Design Open Side Calender


Mechanical lifting for quick, easy removal of any roll without disturbing roll above or below.
Top roll is air loaded —top and intermediate rolls are lifted mechanically.
Solid box framing for rigidity and vibration dampening.
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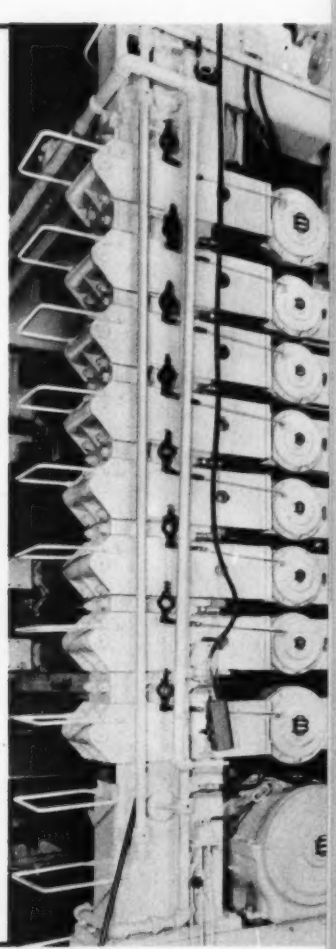
Stabilizing points on arms keep rolls from shifting right or left.
Adjustable arm pivot points insure correct roll alignment.
Doctor settings always constant — mounted on bearing housings—move with roll.
Long arms simulate straight line vertical movement of rolls— reduce "barring."



A papermaker interested in a modern calender that is easy to operate and maintain will instantly recognize and appreciate the superior design features of this open side calender.

This modern open side calender is part of Black-Clawson's comprehensive advanced design standardization program for all paper machine components. Used as single or double stacks, this rugged calender stack is built in three basic sizes to suit large, medium or small machine requirements. Plan now to learn more about it. Call or write...

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Section 2300 volt Oil Circuit Breakers

Kraft Division Charleston, South Carolina, Mill—West Virginia Pulp and Paper Company

13,800 volt & 2300 volt Cable Left over Circuit Breakers in Powerhouse

2300 volt Control Cubicles for Paper Machine

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President & Founder

Each electrical contracting job presents its own unique problems. This project called for the modernization of plant, and the correction of continuing electrical power failures due to corrosion and other factors which were causing a large drop in production. An engineering study was made by us of the entire electrical power and distribution system. Precision operation was effected by the design and construction of centralized power control stations. These were housed in chambers filled with purified air under pressure—a forerunner of existing air conditioning methods. Protective equipment and circuitry was installed. Cable specifications were rewritten which extended the corrosion-resistant qualities and life of the cables. A shift to a 13.2 kv power distribution system was initiated and the existing 2300 v equipment was redesigned to tie-in to this new system.

This work was accomplished without interruption of normal plant operation, and has resulted in successful operation and efficient production over the past 14 years. This work was also performed in other plants of the same company with equally successful results. It may be noted that many of the practices developed and employed then in making these changes and in combating corrosion are now standard in the industry.

We cordially invite your inquiries regarding your electrical construction problems.

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process for making newsprint from de-inked, waste paper stock.

Newton Paper Co. of Holyoke, Mass., is being acquired by the *Sonoco Products Co.* of Hartsville, South Carolina. Newton will continue as a subsidiary of Sonoco to operate under its present management and serve its customers with its specialized board product.

A new corporation under the name of *Fiori Paperboard Inc.* has taken over the business and assets of the *Queen City Paper Co.* of Cincinnati.

Kimberly-Clark Corp. has announced that negotiations have been completed for the acquisition of the Paris firm, *Societe Sopaline,* for the production and distribution of K-C products in France.

The *Hooven Division of Baldwin-Lima-Hamilton Corp.* has been purchased by *Beckett Paper Co.* The purchase price was estimated at $500,000.

Beloit Iron Works is paying $3,850,000 for a 20 per cent interest in the British *Walmsley (Bury)* group manufacturing paper-making machinery. This is the second overseas expansion project for Beloit. The company now operates an Italian firm as a subsidiary.

Directors of *F. C. Huyck & Sons* have proposed a three-for-one split of its common stock and called a special meeting of stockholders to authorize the split. Stockholders will also be asked to change the name of the company from F. C. Huyck & Sons to *Huyck Corp.*

E. D. Jones Corp., of Pittsfield, Mass., a member of the Beloit group, has announced the acquisition of the complete North American assets of the *Sveen-Pedersen Sales Corp.* of Long Island City, N.Y. E. D. Jones will supervise sales and service of Sveen-Pedersen Saveall units in the United States, Canada and Mexico. In Canada, Sveen-Pedersen units will continue to be handled by Jones Canadian affiliates, *Alexander Fleck Ltd.* of Ottawa.

The merger of *Gair Woodlands Corp.* into *Southern Paperboard Corp.* and the subsequent merger of *Southern Paperboard* into *Continental Can Co.* has been announced. Both corporations had been operating as wholly owned subsidiaries of Continental Can Co. since June, 1959. Continental Can had acquired 60 per cent ownership of the corporations when the *Robert Gair Co.* was merged into Continental in 1956. Complete control was accomplished in June, 1959, with the acquiring of the assets of the *Fort Wayne Corrugated Paper Co.* by Continental.

Hercules Powder Co. of Wilmington, Del., will acquire *Imperial Color Chemical & Paper Corp.* of Glens Falls, N. Y., under a tentative agreement reached by directors of both companies. Imperial Color is a major supplier of pigments to the paper and plastic industries.

Forestry Notes

Thomas P. Brogan has been appointed by the American Forest Products Industries to serve as Midwest regional manager. He will coordinate AFPI's forestry educational program through the Chicago, Cincinnati, Ohio and Green Bay, Wis., district offices. *Lovell C. Rawson* of Boston has been assigned to the position of Eastern regional manager and will coordinate AFPI's forestry educational program through the Boston, New York City and Harrisburg, Pa., district office.

Alaska's wilderness areas are among the few in the world that offer an opportunity to interpret both fungus and coniferous forest cycles as they likely appeared here following the ice age, according to Dow V. Baxter, professor of forest pathology and botany at the University of Michigan. Baxter explains: "A knowledge of the occurrence of parasitic and other fungi in various stages of developing wilderness is one method that might be used for forecasting disease and for formulating disease-preventive programs for managed forests in other parts of the country".

J. Reid Parker, assistant professor of forestry at the University of Georgia, has started a study of the economics of naval stores. This study will seek means for promoting efficient gum production as an intregal part of forest management. The study is supported by the American Turpentine Farmer's Association and the Union Bag-Camp Paper Corp.

An antibiotic fungicide has been used for the first time in forest protection. The new antibiotic, called Actidione, has successfully killed blister rust cankers on hundreds of thousands of western white pines in northern Idaho. E. L. Kolbe, chief forester for Western Pine Association, reported these results at the annual Northwest Forest Pest Action

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Now in its 37th year of publication, P&PMC is the most consistently used and respected publication in the paper and pulp industry—**places advertisers' messages before buyers when they are seeking information leading to buying decisions.**

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The P&PMC price structure—most economical in the field—makes it easy for advertisers to bind their complete product story into the industry's basic information source book.

Special one-time rates are available to advertisers who take specified additional space in The Paper Industry, monthly magazine for the field.

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For Example:

	Regular 1 Time	Special 1 Time	Furnished Insert
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LAYNE-NEW YORK COMPANY
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Seattle, Washington

LAYNE-VENEZUELA C. A.
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COMPANIA ARGENTINA PRODUCTORA DE AGUA, S.R.L.
Buenos Aires, Argentina

LAYNE FRANCE—Paris, France

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Coming Events

TAPPI

February 22-25 — 45th Annual Meeting, Hotel Commodore, New York, N. Y.
May 23-25 — 11th Annual Coating Conference, Edgewater Beach Hotel, Chicago, Ill.
June 14-16 — Pulp Bleaching Conference, Edgewater Beach Hotel, Chicago, Ill.

PIMA

February 18 — Michigan Division, Hotel Harris, Kalamazoo, Mich.
April 23 — Michigan Division, Hotel Harris, Kalamazoo, Mich.
April 29 — New York-Canadian Division, Sheraton-Syracuse Inn, East Syracuse, N. Y.
May 13-14 — Pennsylvania-New Jersey-Delaware Division, (Spring Meeting), Hotel Du Pont, Wilmington, Del.
June 7-9 — National Meeting, St. Francis Hotel, San Francisco, Calif.

OTHER MEETINGS

February 21-24 — 42nd National Meeting of the American Institute of Chemical Engineers, Atlanta-Biltmore Hotel, Atlanta, Ga.
February 22-25 — 83rd APPA Annual Meeting, Waldorf-Astoria, New York.
February 22-25 — American Pulpwood Association, Annual Meeting, Roosevelt Hotel, New York.
February 23 — Salesmen's Association, National Meeting—41st Anniversary Luncheon, Waldorf-Astoria, New York.
February 24 — Material Handling Institute Inc.'s Traveling Clinic, Statler-Hilton Hotel, New York City.
February 25 — Material Handling Institute Inc.'s Travel Clinic, Warwick Hotel, Philadelphia.
March 12-15 — 47th Annual Convention, National Association of Waste Material Dealers, Waldorf-Astoria Hotel, New York.
March 22-23 — Folding Paper Box Association of America, Annual Meeting, Ambassador Hotel, Los Angeles.
March 27-30 — National Paper Trade Association, Paper Show and Annual Convention, Waldorf-Astoria, New York.
March 28-April 8 — 16th Annual Fiber Microscopy Course, Institute of Paper Chemistry, Appleton, Wis.
March 30 — Paper Club of New York, Annual Dinner, Grand Ballroom, Waldorf-Astoria, New York.
April 4-7 — AMA's 29th National Packaging Exposition and Conference, Convention Hall, Atlantic City.
April 6-7 — Ninth Annual Forestry Symposium, Louisiana State University.
April 19 — SAPI Eastern Luncheon meeting.
May 12-13 — 24th Annual Executives Conference of the Institute of Paper Chemistry, Institute of Paper Chemistry Campus, Appleton, Wis.
May 23-26 — Annual Design Engineering Show, New York Coliseum, New York.

News of the Industry . . .

Council in Portland. He stated that the development is of such significance that we are reviewing all of our forest disease problems to see if we can use similar attacks on other fungii.

A new survey on recreational use of commercial timberlands will be made in 1960 by American Forest Products Industries, national sponsor of the voluntary American Tree Farm System of growing trees as a crop on private lands. The survey would enable the forest industries to tell their story better, that millions of acres of Tree Farm lands are available for hunting, fishing, hiking, picnicking, camping and other forms of recreation.

G. Corydon Wagner Jr., an executive of the St. Paul-Tacoma Lumber Co., Division of the St. Regis Paper Co., has been appointed adviser to the director, Forest Products Division, Business & Defense Services Administration, U. S. Department of Commerce.

The Georgia Forestry Commision has reported a population build-up of a defoliating insect known as the pine sawfly. The heaviest damage has been reported in Bulloch County where an area of 500 acres or more has been approximately 80 per cent defoliated.

American Forest Products Industries has announced the formation of a Women's Affairs Division. This division will work closely with women's groups in matters of forest conservation as embraced in the multiple-use concept of tree farming. Rosalie M. Koch, a former WAVE officer has been appointed as director of this new division.

A school tour guide booklet listing Illinois tree farms and forest industries is now being undertaken for preparation and distribution to every school in the state. This was announced at the annual meeting of AFPI's National Council.

John H. Hinman, chairman of the board of International Paper Co., has been elected as the 1960 president of American Forest Products Industries. Hinman succeeds John B. Veach, president of Hardwood Corp. of America, who now becomes a trustee.

Recent Expansions in the Industry

B. C. Tells of Forecast on New Pulp Mill Construction

Six specific pulp mill projects which could materialize and five more sites for future consideration has been forecasted by British Columbia.

The six specific projects are: (1) Peace River Forest Industries Ltd. has been formed by a Fort St. John lumber company in the northeast; (2) a mill, which could be integrated, in the Central interior; (3) Aluminum Co. of Canada and Powell River Co. jointly formed Kitimat Pulp & Paper Co. in 1959 to consider a project in the region of the big Alcan smelter at Kitimat; (4) A pulp mill near Gold River in Vancouver Island is considered a perfect site for shipping to the Orient; (5) Canadian Collieries Resources Ltd. is examining a site at Union Bay on the east coast, Vancouver Island; (6) The southern interior in the Keremeos region, is also an attractive site.

The five sites for future consideration are: Quesnel, in the central interior; Squamish, north of Vancouver; Kootenay Lake, in the southeast corner; Kamloops, in the south-central interior; and Donald, an interior site.

British Columbia now has 13 pulp and paper mills with a fourteenth under construction.

U. S. Loans Philippines $5.3 Million for Construction of Paper Plant

The United States will lend $5.3 million to the Bago Pulp & Paper Co. for a paper plant on the island of Panay in the Philippines.

The mill, located in the heart of a sugar-producing area, will manufacture pulp and paper from bagasse.

A loan of the same amount was awarded last July to the Philippine paper industry for the pulp and paper mill of Bataan Pulp & Paper Co., which produces paper from bamboo.

Construction Starts on Mill in India

The integrated pulp and paper mill of Mandya National Paper Mills Ltd. has begun construction in India. Technical services including supervision of construction and initial operation are being performed by Parsons & Whittemore/Lyddon Organization.

A complete package of production machinery has been placed by Parsons & Whittemore with equipment manufacturers in France and the United States. A 138-in.-wide fourdrinier paper machine and all auxiliary papermaking equipment as well as a liquor burning and chemical recovery system will be supplied.

An initial capacity of 35 tons per day of high grade writing and printing papers will be produced from sugar cane bagasse pulp. The mill is expected to go into production during 1961.

Celgar Plans to Make Target Date for Completion of New Mill

March 1961 was the planned date for the completion of Celgar's new multi-million-dollar pulp mill project. Construction schedules to date have proved to be realistic.

This integration of sawmill and pulp mill facilities is unique in the interior of British Columbia. It will enable the best use to be made of all the wood being grown on Celgar's 860,000-acre tree farm.

(Continued on page 803)

Just Like Panning for Gold!

You'll get exceptionally low "first cost"

You'll use minimum power

You'll need less maintenance

with the

Kalamazoo "Side Hill" Washer

These practical slide washers give a better and more effective wash job than other washing methods. They may also be used as thickeners and savealls. These units are designed by Kalamazoo engineers — experts in serving the paper industry for more than 90 years. Our experience enables us to completely prefabricate the units of top quality materials. Installation supervision can be furnished.

Laboratory size units are available for experimental purposes in determining the proper angle and screen mesh.

Write today for information on capacities and cost estimates.

WOOD TANK DIVISION

Kalamazoo TANK & SILO CO. 260 HARRISON ST. KALAMAZOO, MICH.

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*Idea submitted by Hugh W. Gorton, Missisquoi Specialty Board Div.—Std. Packaging Corp., Sheldon Springs, Vermont

Photo by Ewing Galloway, N. Y.

"Reminds me of HAMILTON Felts . . . you can look far and wide and still not beat 'em"

YOU CAN'T BEAT
Hamilton
FELTS

"Lookout Mountain near Chattanooga, Tennessee is surely well named,"
says Hugh W. Gorton.
"From it, on a clear day,
you can see seven states!

"Now, when it comes to felts
you can look far and wide, too,
but for water removal, long life
and trouble free service—
you can't beat Hamilton Felts!"

Ask your Hamilton Felt service salesman about our 300 proven styles. If one of our "standard 300" won't solve *your* needs, we will be happy to design a Hamilton Felt that will.

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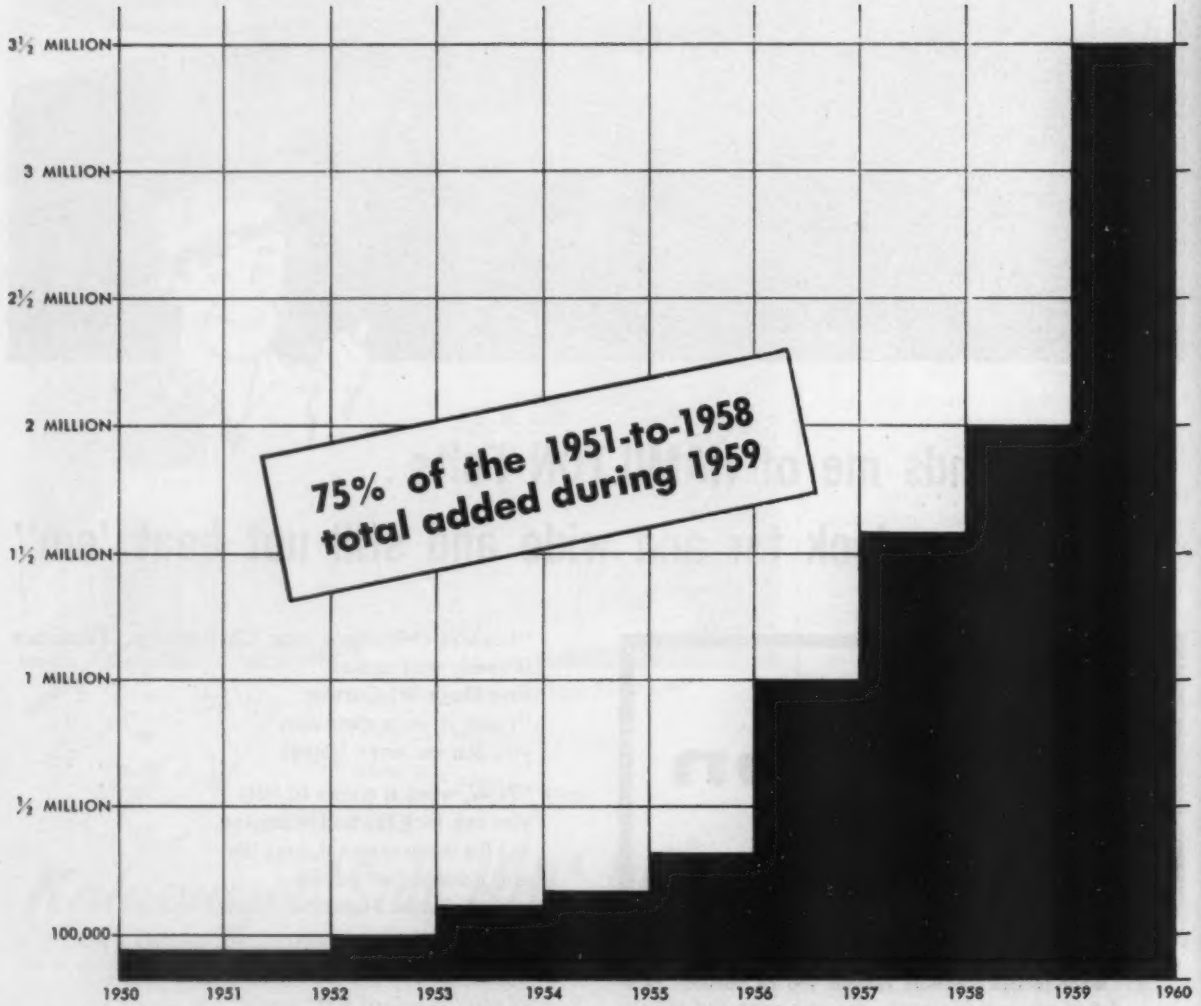

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Canadian Representative: Paper Machinery Limited, 320 Dominion Square Bldg., Montreal, Que.

For more data circle 128 on Post Card

News of the Industry . . .

Multimillion-Dollar Expansion for Moraine

Moraine Paper Co., a division of Kimberly-Clark Corp., has been planning a multimillion-dollar expansion program at its West Carrollton, Ohio plant.

Details of the plans have not been revealed, but it was indicated that the project could result in approximately 100 more job opportunities.

New Detroit Office for J. O. Ross

A new building located at 13050 Puritan Ave., Detroit, will house engineering and office personnel of J. O. Ross Engineering Division, Midland-Ross Corp. and representatives of the Midland-Ross Corp. The increase of Ross services and number of employees necessitated the move.

Milprint Expands East And West Coasts

Expansion and consolidation of the manufacturing operations on both the East and West coasts is the current program for Milprint Inc.

The company is building an addition to its large plant in Downingtown, Penn., which will absorb Milprint's present separate plant at Christiana, Pa. The Downingtown plant will be completed in early spring of this year.

On the West Coast, ground has been broken for an addition to the company's plant in South San Francisco. This facility will absorb all of the manufacturing formerly done at the Los Angeles plant. June 1 is the date set for completion of the San Francisco plant.

Beloit Eastern Finds New Home for Engineering Department

Beloit Eastern Corp., a division of Beloit Mfg. Co. of Beloit Wis., has leased a portion of an industrial building in Acorn Industrial Park, Downingtown, Penn. The company will use this space to house its engineering department. Beloit Eastern currently occupies more than 100,000 sq. ft. of space in Downingtown.

West Florida to Get $13.5 Million Mill

Construction has begun on a new $13.5 million corrugated paperboard mill at Port St. Joe, Fla. Roger L. Main, president of St. Joe Paper Co., has announced that a newly organized firm, Florida Gulf Fibre Co., will build this semi-chemical corrugating mill.

Main said the construction of the mill is another step in the program of the St. Joe Paper Co. in developing West Florida. However, the mill will be an independent operation.

Black-Clawson Forms New Department

The establishment of an Air Systems Department for engineering and marketing its new line of high-velocity air drying equipment has been announced by Black-Clawson.

This department will function independently of the company's domestic pulp and paper mill machinery divisions. The chief product in the department will be the revolutionary high-velocity 3-D air dryer. It will be under the joint direction of John D. Lynch and Robert R. McKellar and headquartered at Fulton, N. Y.

Dura-Lee Occupies New Plant

Dura-Lee Corp. is now in production at its new plant facilities in Kansas City, Kansas.

The new plant includes full scale production facilities for Polyvin, which has been produced in its semi-works at the Kansas City, Mo., plant. It will also include film coating, slitting, sheeting, printing and bag-forming machinery, as well as an integral machine shop and product evaluation laboratory.

Consolidated Establishes Indiana Plant

Consolidated Paper Co. of Monroe, Mich., has started operations of its new branch plant in Bremen, Indiana.

A complete corrugator with all box-making equipment has been installed for the production of corrugated sheets, plain and printed corrugated containers and die cut parts.

Manchester Machine Completes Move

Manchester Machine Co., a subsidiary of Diamond National Corp., has completed its move to the company's new $1.5 million plant at Monroe, Ohio. The new plant is said to more than double the productive capacity of the old plant located in Middletown, Ohio.

A number of new machines have been installed in the new plant at a cost estimated of more than $150,000.

For more data circle 129 on Post Card

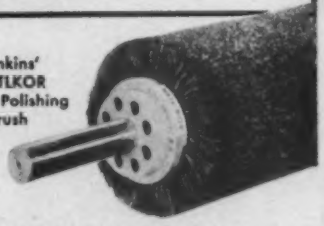
PRIVATE EYES

Jenkins' METLKOR brushes, teamed with Viking's Void Detector, check every inch of paper as it is made, find holes, measure them, count them, record them, pinpoint their positions and signal the operator, all automatically. The Jenkins' feeler brush, a critical part of the system, sends a low voltage pulse to the Viking Indicator Unit whenever a hole appears.

John Glump, Vice-President of Viking Instruments, Inc., of East Haddam, Conn., says: "Jenkins' brushes do a superb job for us. They are an improvement on 13 counts:

1. Improve accuracy of flaw detection.
2. Have no abrasive effect on product.
3. Eliminate lint problem.
4. Outlast previous brushes 3 to 1.
5. Made exactly to size, no cutting or alterations necessary.
6. Simplified mounting.
7. Improved construction.
8. Superior bristles.
9. Refillable when bristle is worn.
10. More economical.
11. Free engineering service.
12. Speedy solution to problem.
13. Quick delivery."

Jenkins' METLKOR Paper Polishing Brush



Jenkins' also makes the following brushes for the paper industry:

Conveyor Cleaning • Blanket Washer • Fourdrinier Wire Cleaning • Polishing • Coating • Dusting • Dampening • Spray • Sieve • Static Elimination • Flocking • Felt Cleaning • Feed or Carrier • Paint Brushes • Floor Sweeps

Specify Jenkins' METLKOR
the original . . . the best *Metal Core* brush

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CYLINDER BRUSHES
and LIFEWOOD® WOOD BACKED BRUSHES

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For more data circle 130 on Post Card

American Viscose Installs Towers for Drying and Conditioning Cellophane Coatings

SEVERAL four-story-high towers are now in operation to dry and condition cellophane coatings manufactured at the new Marcus Hook, Pa., plant of American Viscose.

The towers and coating equipment were engineered, fabricated and installed by the J. O. Ross Engineering and the Waldron-Hartig Divisions of Midland-Ross Corp. The new units are especially valuable in conserving floor space at the plant.

In coating the cellophane, master rolls are mounted on an unroll stand and the web threaded through the processing equipment which includes the Waldron coater, the dryer section of the Ross tower, the conditioner side of the tower, web guide, Waldron water-cooled pull rolls and a winder.

At the coater, the web is led over a spreader roll, down into the dip pan, up between two metering rolls, through four smoothing rolls, and into the drying side of the tower. The coater is enclosed to create a solvent laden atmosphere. Its coating trough is hydraulically raised and lowered in and out of position.

The dryer has two zones, respective heating and circulation equipment being located on the second and third floors as shown in Fig 1. Evaporated solvent is drawn off toward the lower portion of the dryer and ducted to

(Continued on page 807)

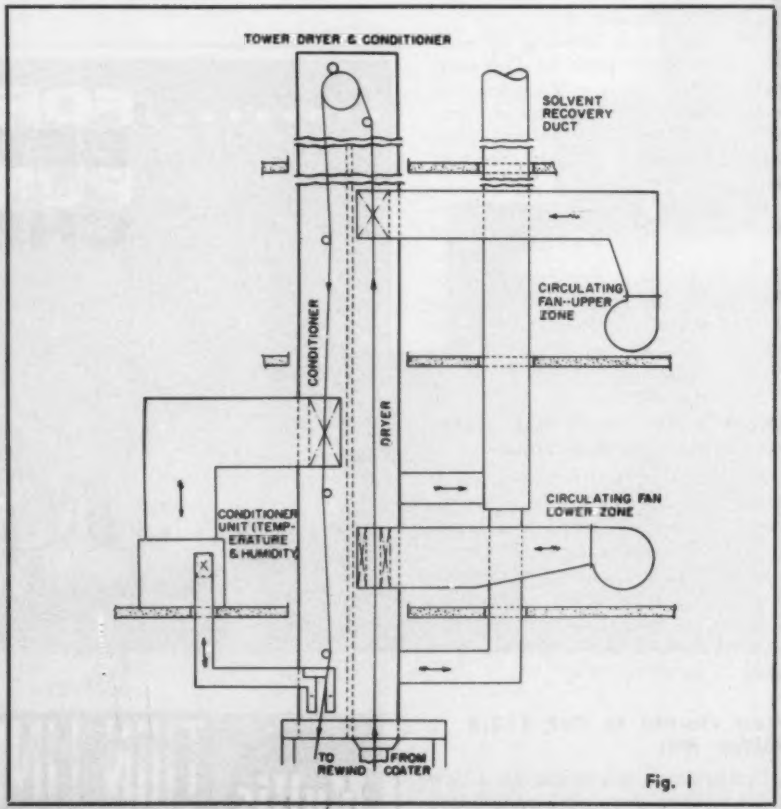
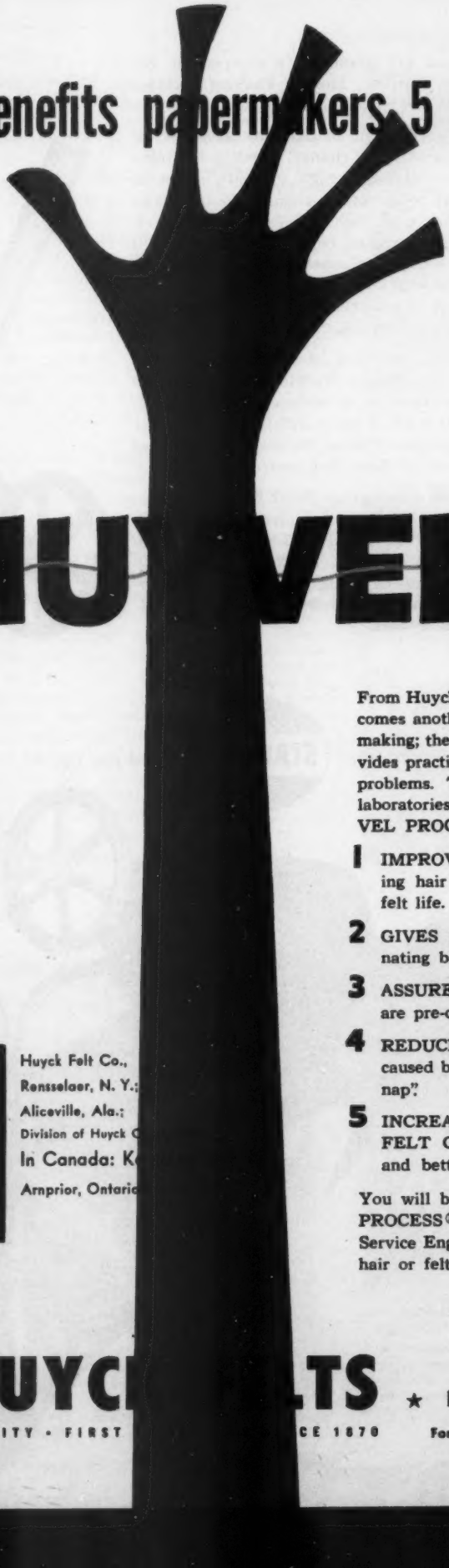


Fig. 1

Ross drying and condition tower showing web travel, solvent exhaust line, fan and supply ducting to dryer (return ducting and heating equipment is on opposite side), and return ducting from conditioner to temperature-humidifier unit (supply ducting and fan are on opposite side).

benefits papermakers 5 ways...



NEW HUYVEL® PROCESS

From Huyck, Science Center of the Felt Industry, comes another outstanding "first" in modern felt-making; the new HUYVEL PROCESS® that provides practical solutions to 5 major papermaking problems. Thoroughly tested and proved in our laboratories and on paper machines, the HUYVEL PROCESS® . . .

1. IMPROVES SHEET QUALITY by minimizing hair shedding from beginning to end of felt life.
2. GIVES FINER SHEET FINISH by eliminating both shell and yarn marking.
3. ASSURES FASTER STARTS because felts are pre-conditioned.
4. REDUCES PICKING AND MARKING caused by "pigtailing", "shankering" and "wild nap".
5. INCREASES PRODUCTION AND LOWERS FELT COST through greater nap retention and better cushion throughout felt life.

You will be hearing more about the HUYVEL PROCESS® from your Huyck Sales and Field Service Engineers — especially if you are facing hair or felt marking problems.

HUYCK FELTS

Huyck Felt Co.,
Rensselaer, N. Y.;
Alicevilla, Ala.;
Division of Huyck C
In Canada: K
Arnprior, Ontario

NEW HUYC LTS ★ INDUSTRIAL FABRICS

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For more data circle 131 on Post Card

Why Hunter Packing Company uses STANOIL Industrial Oil

Two reasons: (1) STANOIL is a superior oil. (2) Along with STANOIL, Hunter Packing receives experienced lubrication technical service.

A special antioxidant in STANOIL gives the oil resistance to *chemical* change. Deposits are minimized. The oil has a high viscosity index, is resistant to *temperature* change. It lubricates effectively at both high and low temperatures. Due to special refining techniques, STANOIL will not readily emulsify. A special additive minimizes foaming. STANOIL has a low pour point. It flows freely at low temperatures. A rust inhibitor in STANOIL "plates out" on metal surfaces.

W. P. "Sandy" Wehking, the Standard Oil man who calls on Hunter Packing Company, has plenty of experience in technical service work. He's been at it for 17 years. Sandy studied chemistry at Blackburn College. He has also completed the Standard Oil Sales Engineering School.

To get more information about STANOIL Industrial Oil and to obtain technical help on your lubrication problems, call the Standard Oil office near you in any of the 15 Midwest or Rocky Mountain states. Or write, **Standard Oil Company (Indiana), 910 South Michigan Avenue, Chicago 80, Illinois.**

Quick facts about
STANOIL Industrial Oil

- Antioxidant gives oil resistance to chemical change, minimizes deposits.
- Inhibitor "plates out" on metal surfaces, prevents corrosion.
- Receives special refining to eliminate emulsion problems. Contains additive to minimize foaming.
- High viscosity index. Resists temperature change.

You expect more from **STANDARD** *and you get it!*

Temperature check. Frank Persson of Hunter Packing Company and Standard Oil lubrication specialist W. P. "Sandy" Wehking inspect one of four compressors in Hunter plant that uses STANOIL Industrial Oil.

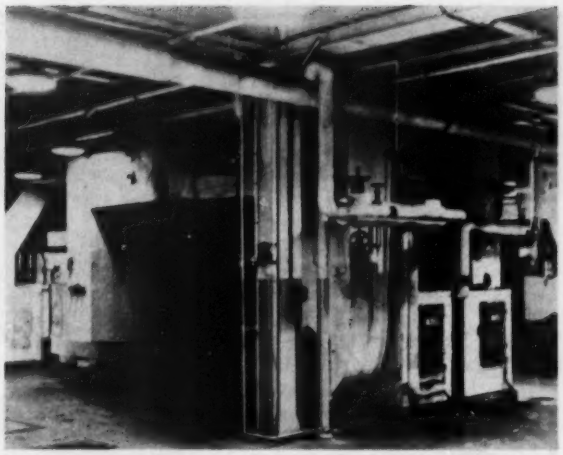
reclaiming equipment located in an adjacent building.

Following the drying stage, the web passes over a water-cooled roll at the top of the tower and travels downward through the conditioning section where moisture evaporated during the drying stage is returned to the web.

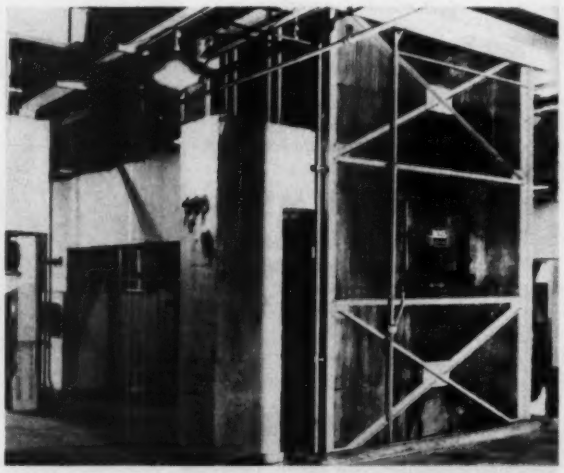
After leaving the conditioner, the web passes through water-cooled pull rolls to the rewind. Equipment is designed for continuous operation, the unroll and rewind stands feeding and rewinding continuously as new rolls are mounted and completed ones taken away.

Much of the equipment is constructed of stainless steel for corrosion resistance and the conditioning equipment is of welded construction for moisture tightness. Temperature sensing elements are located in dryer and conditioner supply ducting and activate automatic controls to regulate temperature and humidity conditions should they deviate from pre-set values.

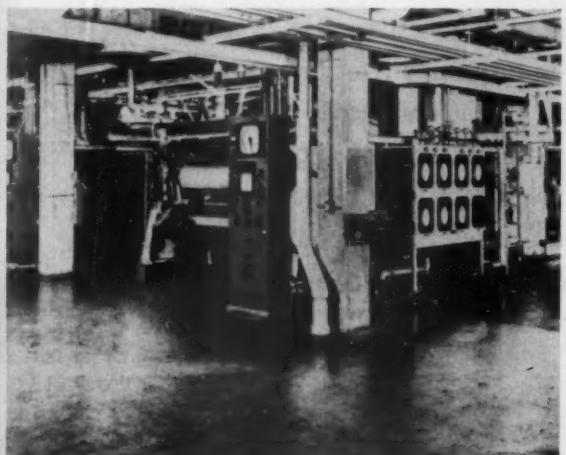
Air from both the dryer and conditioner sections of the tower is recirculated through respective supply equipment to minimize heat losses. However, a high percentage of solvent-laden air is continuously withdrawn from the dryer section and this is replaced with fresh air supplied to the heating units. Steam is the heating medium for both conditioners and dryer, air being warmed by steam coils.



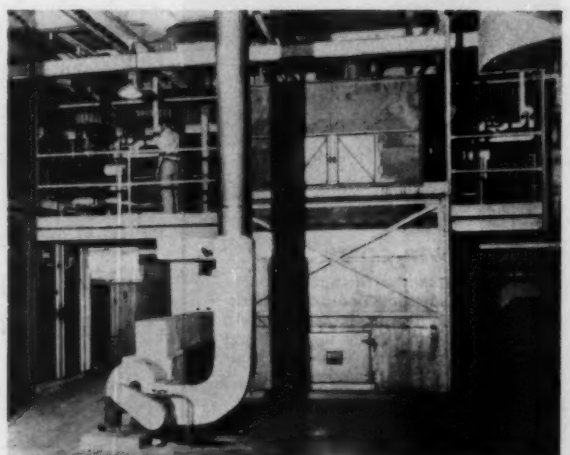
2.—Conditioning equipment at the second floor level. Fan near pillar draws conditioned air from Ross temperature-humidity unit, delivers it to horizontal duct for distribution to vertical duct which has outlets on the floor above and on the floor shown. Duct at right recirculates air from conditioner section of tower to temperature-humidity unit.



3.—Third floor view. Vertical duct in foreground is from temperature-humidity unit on floor below. Horizontal duct returns recirculated air from dryer side of tower to Ross heater, then brought up to predetermined drying temperature prior to being returned to drying section.



1.—View of the ground-floor portion of one of the new cellophane coating lines. Rewind end is shown in foreground, the additional ground floor equipment extending back toward the right hand margin.



4.—Top floor view. Cellophane makes U-turn over water-cooled drum in tower in traveling up through dryer side and down through conditioner section. Fan in foreground exhausts a portion of the conditioner-section air. Balance is recirculated.

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NAMES *in the* NEWS

MacMillan, Bloedel & Powell River Ltd.

With the merger officially announced on December 31 concerning MacMillan & Bloedel Ltd. and Powell River Co. Ltd., a 33-man board directorate was named.

The following five principal officers were appointed:

H. R. MacMillan, honorary chairman; Hon. J. V. Clyne, chairman of the board; H. S. Foley, vice-chairman; M. J. Foley, president; and R. M. Shaw, executive vice-president.

Appleton Machine Co.

Otto J. Korth has joined Appleton Machine Co. as sales engineer. Korth was formerly employed as a sales representative with the Technical Papers Division of Kimberly-Clark Corp.

West Virginia Pulp & Paper Co.

Victor S. Luke, who has had wide experience in administration, operations and sales with two of the company's papermaking divisions, has been named manager of the Multiwall Bag Division.

Triangle Bag Co.

E. A. Jacob has retired as vice president and general manager of Triangle Bag Co. However, Jacobs has agreed to continue his association with the organization in a consulting capacity. Triangle Bag Co. was organized by Jacobs and a partner in 1919. All of the assets of the company were purchased by the Crossett Co. early in 1959.

J. H. Allen will become acting general manager of Triangle Bag.

Mead Corp.

The following executive changes have been recently made at Mead Corp.

R. H. Savage, vice president, has assumed new duties. In his new area of operations, he will work directly with the chairman of the board on planning for the Corporation, and will be concentrating on the development of a number of future corporate projects.

George H. Sheets, manager of Mead's Chillicothe Division, has been appointed manager director of research and development.

Hoyt H. Wheeland, production manager at Chillicothe, has been appointed division manager succeeding George Sheets.

Hugh A. Black, director of industrial relations, has assumed the chief responsibility for the industrial relations department, succeeding A. J. Miller Jr. who died in December.

CIBA Co. Inc.

P. L. Penaud, a graduate of the University of Lyon in France, has come to the CIBA organization in the U.S. to accept the position as manager of the new Pigments Division. This is a newly established division for CIBA.

H. G. Osolin has joined the Pigments Division as supervisor of all the division's technical activities. Prior to this appointment, Osolin was in charge of the pigments application, technical service and control laboratories of the parent company—CIBA Ltd. in Basle, Switzerland.

P. L. Penaud

H. G. Osolin

G. H. Sheets

R. H. Savage

H. A. Black

H. H. Wheeland

Hurlbut Paper Co.

Edwin S. Flinn has been elected executive vice president of Hurlbut Paper Co., South Lee, Mass. He will assume the duties as chief executive officer of the company upon the retirement of E. A. Sitzer.

Whiting Corp.

William G. Dedert has been named manager of research and development at the Swenson Division of Whiting Corp. He is succeeded as manager of the pulp and paper department by J. N. Brown, formerly of Swenson's Chicago sales office.

M. J. Beagle, formerly of Swenson's Houston office, has been transferred to the sales force in Chicago.

J. F. Peter has been transferred from the Harvey home office to the Swenson Houston office.

L. F. Kapp has been transferred from the Swenson home office to the sales staff of the Seattle district office.

Clinton Corn Processing Co.

The following reassignments in Clinton's sales organization has been made.

R. E. Mikkelsen, formerly district manager at Chicago, has requested early retirement because of ill health.

D. R. Reed, formerly district manager at Milwaukee, has been appointed district manager at Chicago.

G. R. Smith, formerly in charge of Clinton's Portland, Ore., office, will succeed Reed as district manager at Milwaukee.

St. Regis Paper Co.

Everett G. Griggs II, president of St. Paul & Tacoma, and a director of St. Regis; G. Corydon Wagner, vice president and general manager of manufacturing and sales of St. Paul & Tacoma; and W. Hilding Lindberg, vice president of St. Paul & Tacoma and general manager of the forestry and logging department of St. Regis

in the Tacoma area, have all announced their retirement from the company but will be available as consultants to the company.

Effective with these retirements, Jack M. Lamb has been appointed general manager for Tacoma area operations of St. Regis.

S. Kepple Pratt, general superintendent of pulp and paper operations at the Tacoma mill, has been named resident manager, succeeding Lamb.

Charles L. Morey has been appointed resident manager of the St. Paul & Tacoma Division operations, including both lumber and plywood.

Robert L. Martin has been named manager of the Forestry and Logging department in the Tacoma area.

The following appointments in the Bag Division of St. Regis have also been announced.

John T. Walton has been appointed manager of marketing services.

Alfred A. Roetzer has been named general manager of packaging services for the Division.

James Wipper has been named division comptroller.

Norbert L. Harms has been named president of the Cupples-Hesse Co. Division of St. Regis. He will succeed S. Cupples Scudder who has retired.

John W. Bolton & Sons Inc.

Eugene J. White will now represent the Bolton Co. selling their full line of machine knives throughout Southern New Jersey, Pennsylvania, Maryland, Delaware and Washington, D.C.

Thomas J. Henry has joined the Emerson Mfg. Co. Division of the Bolton Co. Henry will cover the territory including Pennsylvania, New Jersey and Delaware.

Scapa Dryers Inc.

Kenneth W. Buchanan has been appointed a director of the board and vice president in charge of sales for Scapa Dryers Inc. of Waycross, Ga. Buchanan, who is sales director of Scapa Dryers Ltd. of Blackburn, England, assumes these new responsibilities in addition to those he already holds — managing directorships of O/y. Finnish Scapa Dryers, A/b., Helsingfors, and Scapa Dryers (Pty.) Ltd., Australia.

Perkins-Goodwin Co.

Thomas L. Stirling has been elected vice president, paper department, of Perkins-Goodwin Co. Prior to this new appointment, Stirling served Perkins-Goodwin as director of marketing for the paper division.

K. O. Fosse has joined the Perkins-Goodwin pulp sales department. He will make his headquarters in Perkins-Goodwin's Chicago office.

Valley Paper Co.

Russell S. Madden Sr. has retired as president of the Valley Paper Co. He has held this post for 19 years. He began his career in the paper field in 1909 when he joined the Garnett Allen Paper Co. of St. Louis, Mo. Madden came to Valley Paper in 1942 and was made president to replace the late George S. Morse. He has been an officer in many national associations and at one time served as president of the Writing Paper Manufacturers' Association and of the Cover Paper Manufacturers' Association.

American Cyanamid Co.

The appointment of William F. Furcht as a technical representative of the paper chemicals department has been announced. Prior to his new appointment, Furcht served in the company's research laboratories at Stamford, Conn., where he was engaged in research and development work in the paper chemicals field.

Also appointed to the paper chemicals department was Peter J. Fitzpatrick who will serve as technical representative. He previously served in the New England states as a technical representative to the paper industry.

L. E. Croy

J. Stevens

Marathon

Two long-time Marathon executives, John Stevens and Leo E. Croy, have announced their retirement from the Marathon Division of American Can Co.

Croy began his work at Marathon in 1923 as a sales representative. For the past year he has been vice president in charge of special projects.

Stevens joined the company in 1929 as a plant manager. He served as president of Marathon Corp. from 1952 until its merger in 1957 with American Can Co. He was president and later chairman, of Marathon Corp. of Canada, Ltd., and president and general manager of Marathon Southern Corp.

Both men were members of the board of Marathon before its merger.

Link-Belt Co.

Peter W. Miller has been appointed sales manager of Link-Belt Co.'s Caldwell plant in Chicago. He will succeed Hubert J. McCormick, who will specialize on sales of package handling systems, an increasingly important activity at the Caldwell plant.

R. T. Vanderbilt Co.

Robert W. Shaw, a graduate of Western Michigan University School of Paper, has been assigned to the Kalamazoo office of R. T. Vanderbilt Co. which is located at 125 West Walnut St. He will serve the Midwest territory—Michigan, Wisconsin, Minnesota and Western Ontario.

Shaw is replacing Donald A. Huges who will be returned to the Vanderbilt laboratories at East Norwalk, Conn., to be in charge of a research program that Vanderbilt has just instituted.

Huyck Felt Co.

Clyde J. Pate has been appointed to the position of felt sales engineer in the southwestern states for Huyck Felt Co. Div., Huyck Corp. Pate was with the Texas division of Champion Paper & Fibre Co. for six years before joining Huyck.

K. F. Gothner

C. J. Pate

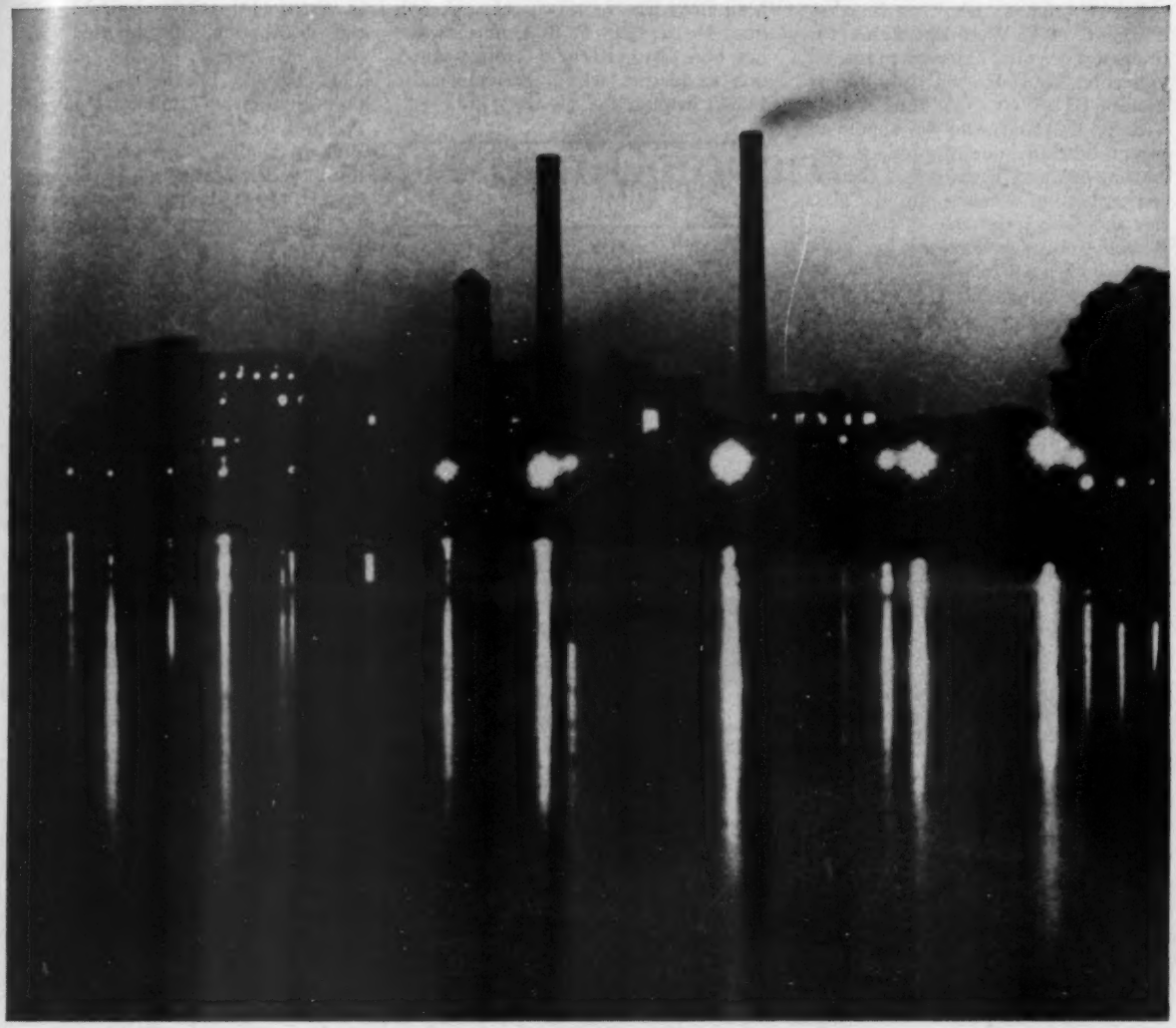
American SF Products

Karl F. Gothner has been appointed to succeed Arne Hallencreutz as president of American SF Products Inc. Hallencreutz has recently been assigned as vice president in charge of international operations of the New York City company's parent firm, AB Svenska Flaktfabriken, Stockholm.

Dow Chemical Co.

M. W. Zembal, a customer service chemist, has been transferred to Freeport, Texas, to take charge of the Southern operations for Dow's Coatings Technical Service group.

(Continued on page 812)



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A Better Paper for you with Clinton Products from Corn

When you need a starch or dextrin, check with *Clinton* first. Clinton's complete line of starches and dextrins designed for paper mill applications can mean better paper for you.

CLINTON TECHNICAL SERVICE is freely available upon request.

CLINTON

CLINTON CORN PROCESSING COMPANY, CLINTON, IOWA

For more data circle 134 on Post Card

Roy C. Simon, who has been in charge of CTS-West operations for the past five years, has been promoted to section head. He will continue as head of CTS-West.

Ralph C. Hand, who was appointed section head of building products several months ago, has been assigned as section head of a new group, the plastics and rubber section.

A. A. Hill, customer service chemist, will succeed Ralph C. Hand as section head of building products.

Stanley F. Roth, a customer service chemist, has been promoted to section head in charge of the packaging section. He replaces F. R. Lehman who has been assigned to a project position as plastics sales supervisor with Dow Chemical Co. (U. K.) Ltd.

Necrology . . .

Frederic Enders

Frederick Enders, chairman of the board of Bulkley Dunton Pulp Co. Inc., started the Fred Enders Pulp Co. in 1918. His company specialized in the distribution of imported wood pulps to American paper mills. In 1922 he was put in charge of the pulp division of Bulkley Dunton & Co. and later was made president of Bulkley Dunton, a position he held until 1958, when he was elected chairman. In 1945, Enders took control of the United Paperboard Co. and was later elected board chairman of that concern. He resigned in 1951. He was also a director and was active in the management of the Missisquoi Paper Co. which is now a part of Standard Packaging Corp.

Hugh J. Chisholm

Hugh J. Chisholm was chairman of the board of Oxford Paper Co. since April 1956. Chisholm's first job at Oxford Paper was secretary to his father, Hugh J. Chisholm. In 1912, he became president and held this post until April 1956. He was widely known in the paper industry and was a vice president and member of the executive committee of the American Paper and Pulp Association.

Dr. Charles W. Boyce

Dr. Charles W. Boyce was former executive secretary of the American Paper and Pulp Association (1928-1940). He served the U. S. Forest Service where he was in charge of economic studies of the pulp, paper and lumber industries from 1920 to 1928. Resigning from the APPA in 1940, he joined the Forest Products Division of the War Production Board in Washington, D.C. Since 1944 he has been a consultant in the paper field and served the American Newspaper Publishers Association continuously, as a consultant, since 1951.

Dr. Gordon Hoover

Dr. Gordon I. Hoover, 59, mill manager of Provincial Paper Ltd. in Thorold, Ont., obtained his M. A. degree in chemistry, 1924, from the University of Toronto. Awarded a Ph. D. from Emmanuel College, Cambridge University, 1924, Hoover then lectured at the University of Toronto for a brief period. He entered the paper industry field in the late 20's and joined Provincial Paper Ltd. in 1930.

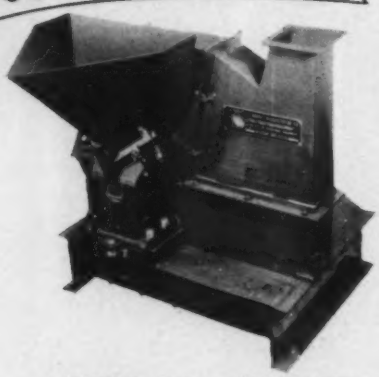
Paul Vandervort

Paul F. Vandervort, 62, was vice president and general manager of The Canton Corrugated Box Co., a division of St. Regis Paper Co. In 1930,

(Continued on page 835)

Reclaim OVERSIZE CHIPS

Murco Rechippers



REAL MONEY SAVING EQUIPMENT FOR MILL OPERATORS LOOKING FOR QUALITY & QUANTITY IN CHIP PRODUCTION

Capacity 400 to 500 cubic feet per hour with 1/2" chips and vibrating feeder.

MURCO 40" 6 KNIFE LEFT HAND RECHIPPER WITH STATIONARY SPOUT.

CAPACITY 700-800 cubic feet of chips per hour.
DISC 40" diameter x 2" thick steel plate provided with blower vanes and renewable wear plates
DISC SPEED 870 RPM . . . SPOUT SIZE 8 3/4" x 8 3/4" . . . MOTOR 51 HP, 870 RPM TEFC Induction Motor . . . BLOWER HOUSING 1/4" steel plate . . . OVERALL SIZE — 4'0" x 6'9" x 4'0" . . . BASE — Cast Iron with extension for the direct connected motor . . . NUMBER OF KNIVES — 6 size 5/8" x 4 1/4" x 12" lg. Alloy Steel . . . SPOUT LINERS — Replaceable steel plate, hard surfaced . . . COUPLING — Flexible . . . SHAFT — High carbon steel . . . BEARINGS — Spherical roller bearing pillow blocks
WEIGHT — 3000 lbs. including motor.

DRIVE-V belted or direct connected to 15 HP motor. Requires relatively small floor space: Overall Height — 5'-9 1/4"; Overall Length — 7'-6 3/4"; Overall Width — 3'-5 3/4" (without motor).

Write for recommendations and complete proposal.

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You **know** we have outstanding valves

– but remember –

No Other Valve Can Compare With –

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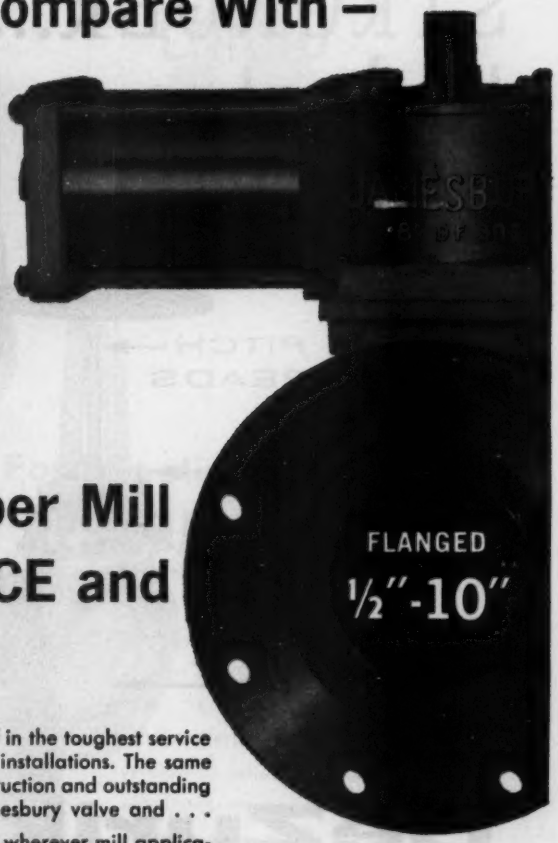

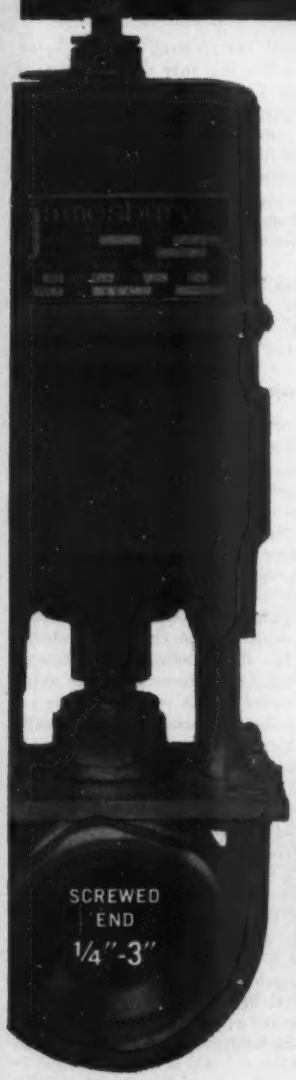

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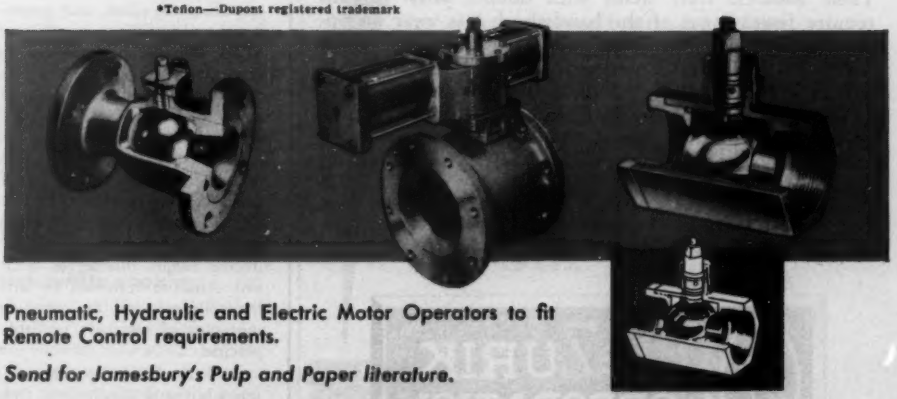

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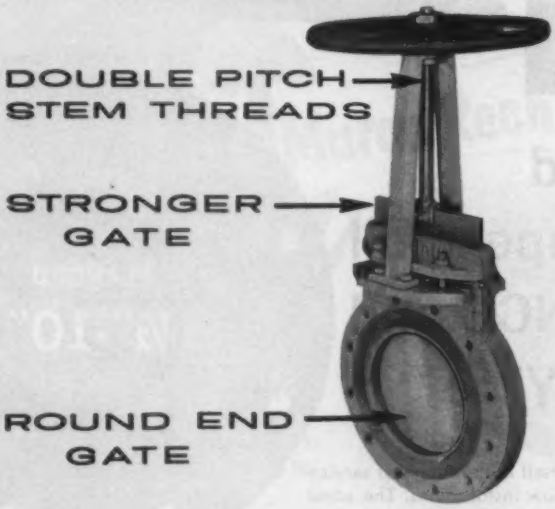

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FOREIGN ABSTRACTS

Determination of calcium in pulp ash

Complexometric titration, used in determining calcium, is more accurate than the gravimetric oxalate procedure and is actually less time-consuming than the permanganate titration technique.

About 20 g. of the pulp sample is ashed in the presence of hydrochloric acid which serves to eliminate sulfur dioxide. The mixture is evaporated with this acid and then filtered, neutralized and titrated with 0.01-molar solution of "Complexon III," the disodium salt of ethylenediamine tetra-acetic acid, using a suitable indicator.

One of the following two indicator combinations may be used: 1 g. murexide, 92.5 g. naphthol green-B and 100 g. sodium chloride; or, 0.8 g. murexide, 0.25 g. methylene blue, 0.2 g. alizarin yellow and 100 g. sodium chloride. Either indicator (amounts not given) will give sharp end-points, changing from red through violet to blue.

Here, the usual commercial pulps, the contents of iron, copper, manganese and magnesium, are so low that they will not interfere with the complexometric titration for calcium. If the iron and manganese content of the initial filtrate exceeds 0.2 to 0.3 mg. per 100 cc., their excess may be eliminated by adding 5 cc. of 0.5-molar triethanolamine per 50 cc. of filtrate.

In the case of pulps that are quite high in magnesium, the calcium and magnesium are titrated together in the presence of eriochrome black-T, and in another sample, the calcium is precipitated as calcium oxalate and the magnesium is determined alone in the filtrate.

Four tables and seven references are given. Ján Polcin. *Papir a celulosa* 13, No. 12, 280 to 282 (1958) (original in Slovakian with Russian, German and English summaries) through *Abstr. Bull. Inst. Paper Chem.* 29, 1673 (1959).

Yellowing of pulps and papers

Two papers give the results of studies made at the Institute National de Recherches Appliquées. The following conclusions were reached. (1) During the aging process, colored substances may be formed from carbohydrates (cellulose and the hemicelluloses) in the sheet, and these may yellow the paper significantly. (2) The colored materials probably occur through what are termed "leuco" derivatives that are simpler in nature than were the original carbohydrates. It appears that one of these compounds, soluble in 95 per cent alcohol, is responsible for ultra-violet absorption at 258 μ of the alcoholic extracts of aged pulps. (3) Degradation of cellulose or hemicelluloses may start with a given chemical treatment such as partial hydrolysis, and can then continue spontaneously in air, even in the dark, with ultimate yellowing of the sheet. Most of the colored substances formed in this way are readily extracted with water, and appear to be relatively low in molecular weight. (4) When a sheet of bleached cotton linters contained small amounts of reducing sugars, artificial aging gave rise to appreciable yellowing. (5) Small amounts of such mildly alkaline materials as sodium carbonate or disodium phosphate, or such acidic materials as oxalic acid, acting upon purified cellulose on artificial aging, caused a degradation and the formation of yellowish-brown materials. (6) Such amino acids as glycine, proline or α-alanine and more especially sulfur-containing amino acids (like cysteine) react with some of the "leuco" materials mentioned above (possibly furfural), and give rise to colored compounds, or complexes, similar in color to those formed with reducing sugars themselves. (7) Glycine added to a sheet of purified cellulose followed by artificial aging, caused degradation of the cellulose and the production of a highly colored substance, the color of which is probably augmented by the presence of the glycine.

As a result of experiments listed in a second paper, the following additional conclusions were reached, (a) The yellowing phenomenon which occurs on artificial aging of the sheet, is not due primarily to air oxidation. This was found to be true, irrespective of whether linters, linters treated with a simple sugar, filter paper

or kraft paper was used. (b) Moisture in the sheet plays an important role in yellowing during aging. At times a difference of 2.5 per cent moisture may cause a loss of 4 G.E. units in brightness. (c) Acids in the air can influence paper stability. Even carbon dioxide can act injuriously in this way, but since its concentration in air is very low, its influence is usually negligible. On the other hand sulfur dioxide, even in small amounts may serve as a hydrolysis catalyst and prove injurious to the paper sheet. (d) Above 0.01 per cent, the presence of acidic or alkaline substance in the sheet can give rise to reversion. (e) Yellowing (reversion) is explained by two different, successive reactions.

Initially, there is a hydrolytic attack on the stock, with the formation of small amounts of sugars. This action may be more or less intense during manufacture, or after actual production, because of the ever present moisture in the paper. The speed of these degradations depends on the amount of moisture and also on the type of stock. For example, sheets high in hemicelluloses are more susceptible than are stocks prepared from linters. The second process may be termed a further breakdown of the sugars formed in the first stage. In this second stage, the sugars give rise to unsaturated derivatives (*e.g.* furfuryl derivatives) which can polymerize to give rise to yellow compounds. The first stage then gives colorless hydrolysis products; the second stage causes their breakdown, with subsequent yellowing. However the complexity of the entire phenomenon requires much more intensive study. The present data indicate that air oxidation (*per se*) is unimportant, but that hydrolysis due to catalysts and especially moisture

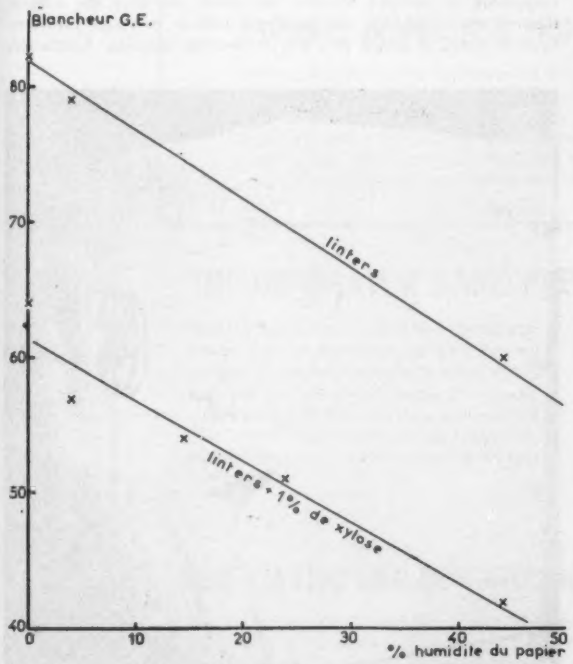

Fig. 1

are highly significant. Figure 1 shows the effects of humidity of the sheet (made from linters alone or linters treated with 1 per cent xylose) on the G.E. brightness ("Blancheur").

A. Roudier and G. Sauret. *Bull. Assoc. tech. ind. papetiere.* No. 3, 109 to 124 (1959) *Ibid.* A. Roudier and A. Saulquin-Bisson. No. 4, 187 to 200 (1959) (original in French, with German, English, Spanish and Italian summaries).

Hemicellulose behavior during sulfite cooking

When, in pulping spruce, a neutral (or slightly alkaline) digestion precedes the conventional acid sulfite cook, dissolving pulps are formed having a lower α-cellulose content than when this initial stage is omitted, even though the overall pulp yield based on the wood, is somewhat higher than that obtained in the one-stage digestion.

On the other hand when two stages are used and the first digestion is carried out at pH 3 to 5, the total pulp yields and the α-

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Foreign Abstracts . . .

cellulose contents are nearly the same as those obtained in the conventional cook. In all of the digestions, the α-cellulose yields, based *on the wood* used, were nearly the same. Those sulfite pulps that are lower in alpha (based on the pulp) are higher in mannan (presumably glucomannan), which appears to indicate that there is a rearrangement of glucomannan in the pulp (possibly a "crystallization" on the surfaces of the microfibrils).

When the acidity in the first cooking stage is too high (and in some cases it was about pH3), then the glucomannans are probably too degraded before they can diffuse to the microfibrils. In such cases, the per cent xylan is actually higher than the mannan content. Presumably, lignin also exerts some resistance to diffusion into the cell wall, at least until it is rendered "hydrophylic".

In the conventional cook, carried out so as to give pulps of dissolving grades, little stabilization of the glucomannan occurs, unless the cook is preceded by long periods of impregnation, at rather low temperatures.

In a series of experiments in which sprucewood was digested at 100°C. over long time periods (so-called "week-end" cooks), in the presence of cotton linters which were kept separated from the wood by 150-mesh metallic cloth, hemicellulosic material was sorbed by the linters quite early in the mild cook and retained by the cotton, even when this cooking period was extended to 40 or 50 hours. This was evidenced by the marked gain in weight of the linters, but more fully by sugar analyses made on the hydrolyzed linters after the cooks. These are shown in Figure 2.

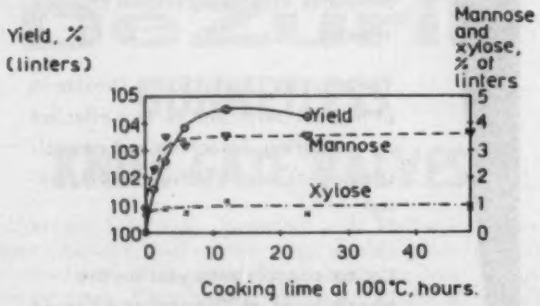


Fig. 2

Similar in these low temperature (protracted) cooks, the lignin reactions of the wood were followed by noting the cooking conditions, the wood pulp yields, Roe numbers, the methoxyl percentage in the fibrous residues at various stages (between 0 and 48 hours), the percentage of residual sulfur in the pulp, the sulfur to methoxyl ratios, as well as data obtained by the partial hydrolysis of the pulps made at various stages of the long cooks.

The data obtained in all phases of this extensive study are given in six tables and shown in eight graphs. Forty-five references. The work was done at the Billeruds AB, Research Laboratory in Säffle, Sweden. Göran A. Annergren and Sven A Rydholm. *Svensk Papperstidn.* 62, 737 to 746 (1959) (in English).

Sulfite spent liquors in agriculture

Although biological tests with *Rhizoctonia solani* and *Sclerotinia fructicola* confirmed the fact that spent liquor *per se* and the concentrated residues from such liquors after alcoholic fermentation and distillation have *no* fungicidal properties, it was evident that these products *augment* the action of known fungicides, especially when the latter contain sulfur. In this action, 15 to 30 per cent of the spent liquor was added to the fungicide; its action appears to be due to its emulsifying action and wetting properties, rather than to a synergistic effect. Certain fungicides and herbicides treated with spent liquor are already on the market, and recent work on the application of spent liquors in controlling plant diseases is discussed.

Thirty references. Jan Becka, Zdeněk Stota, Miroslav Toman and Vojtěch Staník. *Sbornik Vyzkumnych Prací z Oboru Celulosy a Papíru* 2, 201 to 214 (1957) through *Abstr. Bull. Inst. Paper Chem.* 30, 357 to 358 (1959) (original in Slovakian, with Russian, English and German summaries).

New equipment for cooking starch used in papermaking

The cooker shown in Fig. 3 furnishes a new technique whereby cornstarch can be cooked continuously, and, after cooling, introduced economically and uniformly into the pulp suspension in the headbox of the papermachine.

The starch is first mixed with cold water (360 to 480 kilos to 1000 liters) and then enters the cooking equipment — the main working parts of which include a pump for the volumetric delivery of the starch suspension, a regulator for the addition of auxiliary water, a temperature regulator and a steam injector. Inasmuch as swollen starch becomes very viscous, more water is added as the suspension is pumped towards the steam jet; thus the cooked, thinned starch solution can be piped without excessive pressures. Cooked starch is cooled promptly to prevent lumping. Satisfactory

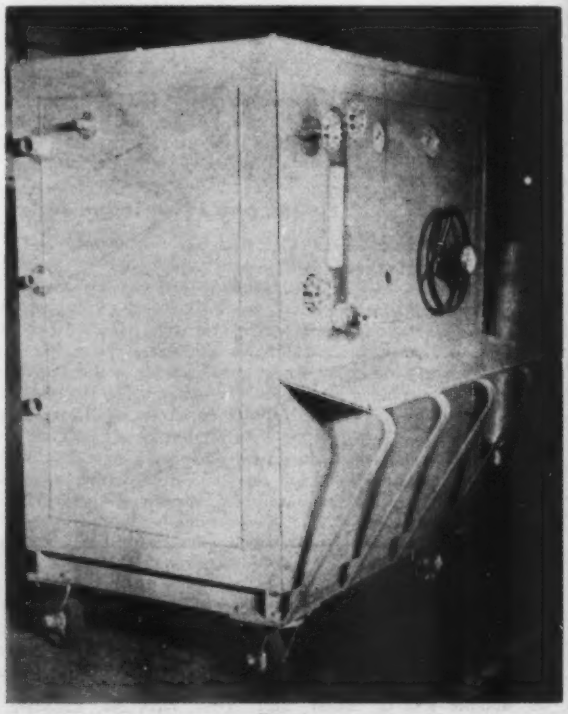


Fig. 3

operation depends on the introduction of steam under constant pressure, a regular water feed, and keeping temperatures as nearly constant as possible.

Typical examples of starch make-up are given and the installations are shown schematically. One of the advantages of the procedure seems to be flexibility in the amounts of starch introduced into the pulp, and the ease and speed with which a paper mill can determine the effects of a specific shipment of starch, without awaiting a series of time consuming tests.

A. Dauwe and J. L. Martin. *Papeterie.* 81, 601 to 605 (1959) (in French).

Continuous Pulping

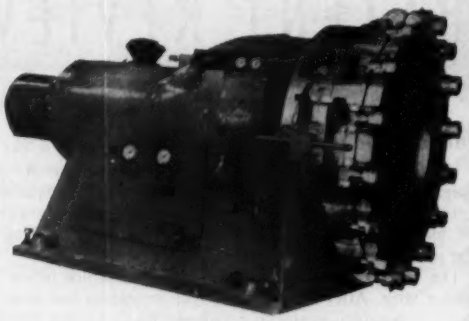
CONTINUOUS DIGESTER

American Defibrator, Inc., offers equipment to meet various demands for continuous pulping of cellulose raw materials. Complete units or components are available for economical production of controlled grades of pulp for the Paper, Wallboard and Roofing Felt Industries.

American Defibrator Continuous Digesters with Screw Feeders or Rotary Feeders and Asplund Defibrators produce pulp at substantial savings in production cost. The capacity of the Defibrator Continuous Digesters ranges from 50 to 250 tons of pulp per day or more. Various raw materials may be used, such as softwood, hardwood, cotton linters or bagasse.

Non-chemical high yield pulps produced by the Asplund Defibrator are used for the manufacture of hardboard, insulating board and roofing felt. Semi-chemical pulps for corrugating medium as well as bleachable grades and pulp for newsprint furnish are also produced by the Defibrator Continuous Digester.

The large size Type D-42 Defibrator is now available and has been developed to meet the current trend in the Pulp and Paper Industry towards larger production units. This Defibrator is driven by an electric motor directly connected to the main shaft by a gear coupling. The grinding pressure is hydraulically controlled and easily adjusted. Therefore uniform, high quality pulp is produced and D-42 units now in operation indicate capacity of about 100 tons/day of non-chemical and 200 or more tons/day of semi-chemical pulp.



TYPE D-42 Defibrator

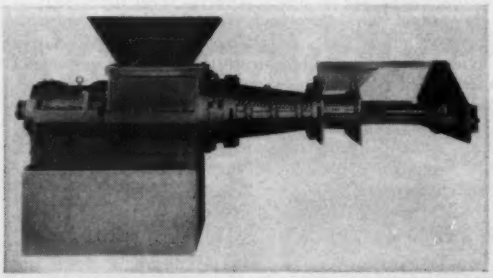
ASPHALT DISPERSION PROCESS

The Asplund Defibrator for treatment of waste paper stock in the "A-D" system has found an extensive application in the Paper Board Industry in order to disperse asphalt, waxes and similar materials in the waste paper. As a result, a clean and sterile sheet is made on the paper machine at considerable savings, since less expensive waste paper can be utilized. Processing costs for steam, power, labor and maintenance are low. No chemicals are required. Total annual capacity installed now exceeds 1½ million tons of waste paper. Inquiries receive prompt attention.

Continuous Dewatering

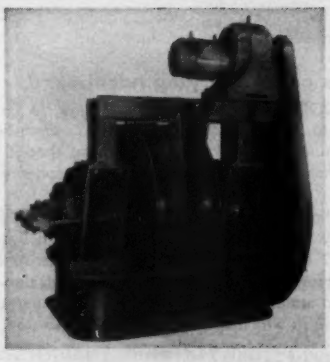
THE DEFIBRATOR BARK PRESS

The Defibrator Bark Press was developed for continuous dewatering of bark for use as fuel. Processing capacity is about 4 to 5 tons per hour, bone-dry basis. The power consumption at this rate runs between 60 and 75 H.P. The continuous operation reduces labor and maintenance costs to a minimum.



THE DAVENPORT DEWATERING PRESS

The Davenport Continuous Press extracts water from fibrous materials, such as various grades of waste paper stock, kraft, sulphite or groundwood pulp. The Model 1B Press has a capacity of about 75 tons/24 hours of pulp, bone-dry basis, dewatering the stock from about 10% consistency to about 35% consistency or higher. The wet pulp entering the press is squeezed and dewatered as it passes through the press and the squeezed out water escapes through the screen plates and drains off at the bottom of the press. There are practically no fiber losses. The pulp is handled very gently by the press which operates at low speed. Therefore, no "fish eyes" are formed in the pulp during the dewatering. The Davenport Press operates very efficiently with low power consumption, high capacity and low maintenance cost. Inquiries receive prompt attention.



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PATENT REVIEWS

MELVIN NORD*

Fourdrinier paper making machine

U.S. 2,893,486, issued July 7, 1959, to Reuben A. Marti and assigned to Crown Zellerbach Corp., describes an apparatus for effecting positive controlled liquid drainage from pulp stock during the making of paper on a fourdrinier-type paper making machine. The apparatus is shown in Fig. 1.

The invention provides a suction-box structure below the fourdrinier wire. After the desired paper formation has been produced

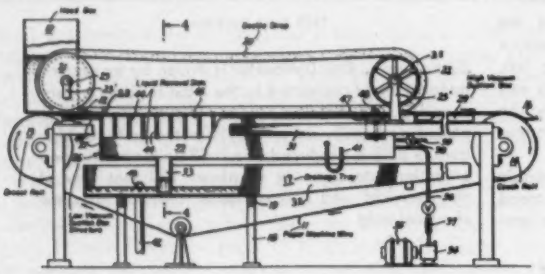


Fig. 1

by the light, uninterrupted vacuum of the present invention, the web may be treated in the usual manner by subjecting it to high vacuum to insure final compaction into a substantially self-sustaining web. However, since the fibers will have been properly oriented and interlaced by the controlled early drainage of the present invention, no damage will be done by such high vacuum.

The invention also provides means to support the wire without the use of table rolls as it passes over the suction-box structure and to simultaneously aid in liquid removal from the underside of such wire without liquid throwback. To this end, the usual table rolls are omitted and a series of relatively narrow, spaced-apart slats is provided in the suction-box structure, extending substantially transversely. The upper-edge surfaces of such slats are substantially on a plane with the under side of the wire to provide a sliding, nonsagging support; such edge surfaces are substantially flat and have relatively sharp edges to thus provide, in effect, a doctor-blade for positive removal of liquid by shearing it from the under side of the wire.

Flexible paper web

U.S. 2,899, 353, issued Aug. 11, 1959, to Edward W. Engel and Isaac R. Dunlap and assigned to Johnson & Johnson, describes a process for producing a flexible paper web, by the incorporation of polymers into the fibers.

A rubber-like polymer and a phenolic resin are co-precipitated under non-acid conditions on the fibers.

Process of humidifying hardboard

U. S. 2,904,893, issued Sept. 22, 1959, to Grant S. Willey and assigned to United States Gypsum Co., describes a rapid process for the humidification of hardboard, so that it will be free from dimensional changes on exposure to atmospheres of varying humidity.

It has been found that 2 to 8 per cent by weight of moisture can be rapidly introduced into a preheated hard board at temperatures above 212°F., provided that the humid atmosphere employed is at a temperature up to 250°F., and provided that the dew point of the humid atmosphere is lower than the temperature of the ambient atmosphere in which the treatment is carried out.

Pulping process

U. S. 2,901,389, issued Aug. 25, 1959, to Shafi Ul Hossain and assigned to Abitibi Power and Paper Co. Ltd., describes a process for pulping wood with an organic pulping agent.

The wood chips are treated at an elevated temperature with an aqueous solution containing dimethyl sulfoxide in a concentration of at least 75 per cent by weight, in the presence of an acid catalyst such as sulfuric acid.

Where the process is continued to the point of substantial completion, that is to say, about 1 per cent lignin, the pulp is a highly purified material which is higher in alphacellulose and lower in pentosans than ordinary sulfite pulp of the same lignin content. There is no strong attachment of the pulping agent to the lignin or the cellulose, and the pulp contains only traces of sulfur, instead of the usual 1 per cent.

Over 90 per cent of the lignin can be recovered from the spent liquor by precipitation resulting from dilution with water.

Vapor confining air curtain for paper machines

U. S. 2,908,212, issued Oct. 13, 1959, to James L. Bryant and assigned to Ross Engineering of Canada Ltd., provides a method for controlling the temperature and humidity within the machine rooms of paper mills.

The machine room is a difficult place to work in because of the high temperature and humidity of air in the room. This condition has been intensified in recent years because of the higher temperature now applied to stock and equipment in order to accelerate production. Since machine rooms are quite large, it is not practical to condition the air in the entire room by ordinary air conditioning means. It is also not practical to shroud the equipment, since it is necessary that the equipment be accessible.

In the present invention, an air curtain is formed by jets of supply air which are directed upwards towards a false ceiling provided over this area of the machine room. The air jets completely ring the vapor producing sections of the fourdrinier machine.

Process for producing hardboard

U. S. 2,907,071, issued October 6, 1959, to John G. Meiler and Earl A. N. Johnson and assigned to Rayonier Inc., provides a process for producing hardboard formed of compressed wood fibers bonded together with a thermoset resin.

The process of the invention consists of three stages of operation, namely (1) preliminary treatment of wood fibers such as are used in wood pulp with resin and preferably also with wax, and the formation of a thick mat, (2) compression of the mat momentarily under high pressure and elevated temperature, and (3) final compression under low pressure and high temperature for a time sufficient to cure the resin. The process is shown in Fig. 2.

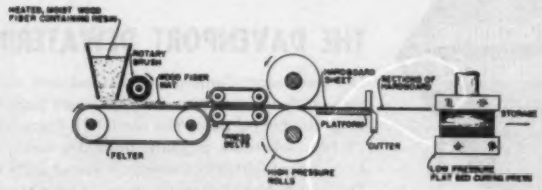


Fig. 2

As an example, hemlock fiber was prepared by steaming chips at 25 psi for 5 minutes, and passing the hot chips through a doubled disc defibrator with a clearance of 20 mils between the discs. The fiber was partially dried in a hot air stream and was sprayed with 20 per cent aqueous phenolformaldehyde solution and molten petrolatum to add 6.0 per cent resin solids and 2.0 per cent petrolatum. The coated fiber was then dried to a moisture content of 10.6 per cent by a stream of warm air. Mats were prepared by blowing the treated fiber onto a screen with a vacuum behind it. The felt was shaved to a thickness of 3 in. by a rotary wire brush and prepressed to a thickness of 0.5 in.

The mat was then fed into a "Rotocure" with a curing drum 72 in. in diameter with an estimated nip pressure of 2500 pli. and a belt temperature of 140°C. It is estimated that the mat was pre-

*Patent attorney, 17600 Pinehurst, Detroit 21.

heated to 60 to 100°C. as it passed over the pressure roll before entering the nip. The belt pressure against the curing drum was 47 psi, the temperature was 175°C. and the retention time was 2 min., terminated by a second pass through the pressure rolls. The finished sheet had a thickness of 0.1 in., a specific gravity of 1.03 and a modulus of rupture of 5400 psi.

Self-bonded paper

U. S. 2,905,585, issued Sept. 22, 1959, to James K. Hubbard and Franklin H. Koontz and assigned to E. I. du Pont de Nemours & Co., provides a paper-like pellicle of a mass of self-bonded, molecularly oriented fiber, produced from a linear synthetic polyester. The material is adaptable to conventional paper-making equipment.

The paper-like pellicle is formed by supplying a dilute aqueous solution of calcium or magnesium thiocyanate to the surface of a mat of polyethyleneterephthalate filaments or fibers, and pressing the matted structure while heating to remove solvent. The resulting paper-like pellicle is self-bonded, i.e. a true joining of fibers or filaments at points of intersection is attained without the presence of an added adhesive.

Silencer

U. S. 2,900,024, issued Aug. 18, 1959, to Donald E. Holcroft and assigned to Scott Paper Co., provides a silencer for use with suction rolls in papermaking machinery.

As shown in Figs. 3 and 4, a comb-like silencer 33 is mounted in a recess 32 on the offgoing side of the suction box 26.

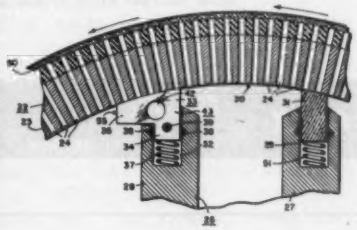


Fig. 3

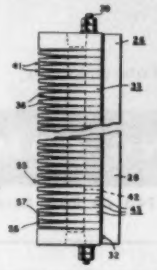


Fig. 4

The silencer operates to prevent the formation of noise by creating a passageway of restricted dimensions through which the air moves from the area of atmospheric pressure into the partially evacuated holes 24, and is metered slowly into the holes 24 at a controlled rate so as to prevent the formation of unwanted sound. As the cylinder rotates, each hole 24, being at less than atmospheric pressure, and being of a diameter greater than the minimum thickness of the lamination 43 at its surface 36, moves generally above the narrow root or apex of a groove in the silencer 33, and a very small quantity of air is metered into the evacuated holes through the groove. As the cylinder continues to rotate, the area of the metering-opening increases as the hole passes along the groove, because at least one side-wall of each groove is disposed at an angle to the direction of the movement of the hole passing over it, and the metering-opening becomes increasingly larger, to permit more and more air at atmospheric pressure to be metered therethrough.

Controlling stock level in a headbox

U. S. 2,901,040, issued Aug. 25, 1959, to Marvin F. Gade and assigned to Kimberly-Clark Corp., provides an apparatus for the control of the stock level in a pressurized headbox for a paper machine.

The invention consists of a pneumatic control system which relates the air pressure in the headbox to the stock level. By this arrangement, the stock level can be accurately controlled at a predetermined optimum level, within very narrow limits.

Suction press assembly

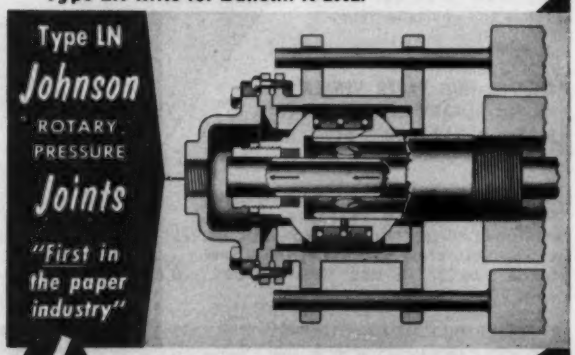
U. S. 2,888,074, issued May 26, 1959, to Lloyd Hornbostel and assigned to Beloit Iron Works, describes an improved press-section arrangement for light-weight webs and tissues, and an improved method for de-watering such webs.

The tissue is carried on a felt which laps a suction pick-up roll, a suction press roll and a press roll. The press roll defines a press

For High Speed Paper Machines with Revolving Syphon Pipes

In the Type LN Johnson Joints the revolving syphon pipe is made a part of the rotating assembly, yet is permitted longitudinal movement. Sealing is still accomplished without packing. Simple support rods carry all the weight of joint and connections, permit the rotating assembly to "float" freely inside. Special hangers and brackets adapt the mounting for machines with either open or enclosed gearing.

Johnson Joints fit all needs on paper machines, calenders, corrugators, waxers, embossers, roofing machines, printing presses. For full data on Type LN write for Bulletin N-2002.



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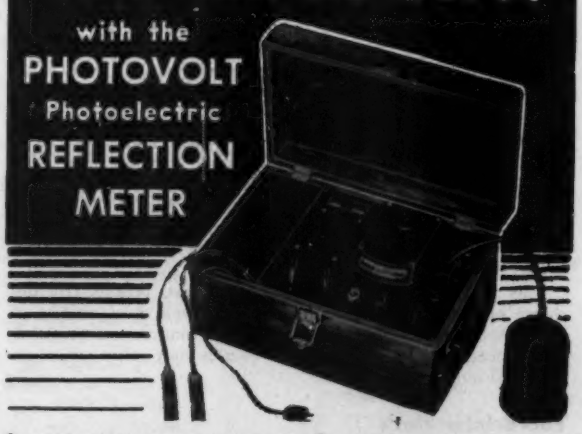

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HANCHETT TRAVELLING WHEEL TYPE KNIFE GRINDER

MODEL AK AUTOMATIC

EXTRA HEAVY DUTY

SPECIFICATIONS

Capacity—84" to 396" lengths; Motors — 7½ to 40 H.P., Balanced; Drives — Mechanical - Hydraulic; Speeds—10' to 150 ft. per min.; Wheels—16"-20"-24" Dia.; Types — Cylinder - Segmental; Bearings — 100% Ball and Roller Types

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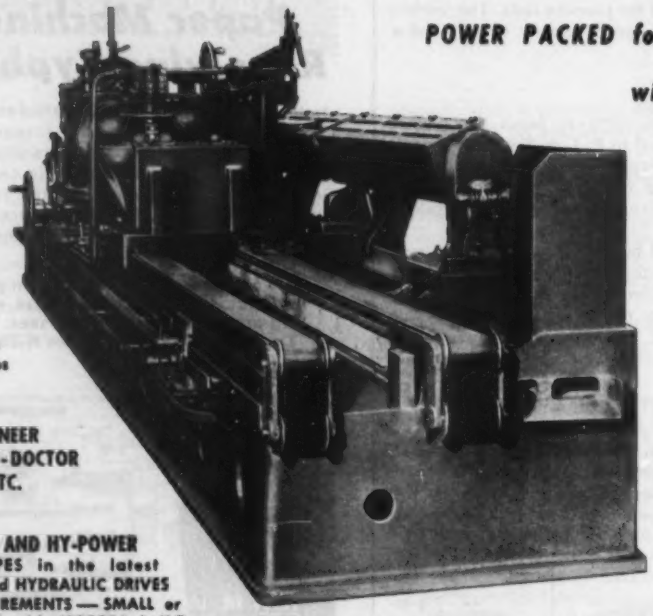

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nip with the suction area of the suction press roll, and is covered with a wire mesh periphery in direct contact with the web on the felt. This permits the drawing of air through the wire mesh and then through the tissue and felt. The open wire does not cause adherence between the tissue and the press roll covered by the mesh, and the tissue thus continues to travel on the felt. The combination of the very thin tissue and the perforate wire-mesh covered roll-surface permits a substantial amount of de-watering to take place at the suction gland.

Preconditioning chips in a digester

U. S. 2,901,039, issued Aug. 25, 1959, to Sven A. Salmonson, provides an improved chip digester having steam injection means which pre-steam wood chips and distribute them in a uniform density in the digester.

This preconditioning treatment of the chips, permits free discharge of trapped air in the digester and avoids the formation of air pockets in the chip mass. Automatic controls are provided, which operate the steam injection nozzles only when chips are being fed into the digester.

Fourdrinier cloth

U. S. 2,903,021, issued Sept. 8, 1959, to Grenville R. Holden and Arthur Schiff and assigned to F. C. Huyck & Sons, provides a fourdrinier cloth or "wire" made of a synthetic resinous material such as nylon.

The fourdrinier cloths are completely flexible in all directions and are very easy to install on the paper-making machine. They are not subject to damage as a result of creasing or wrinkling during shipment or installation. They have no joints to fail or offer uneven porosity. They also resist shock loading, such as that brought about by wads of paper stock or foreign materials being dropped on the wire, or caught between the wire and a roll or suction box. Particles removed from these fourdrinier cloths are not abrasive. Thus, the use of these cloths should result in a longer life for various machine parts, such as suction boxes.

Other Patents of Interest to the Pulp and Paper Industry

Subject	Inventor or Assignee	Patent No.	Date
Protective corner pad for packing mirrors	Highland Container Co., Inc.	2,896,833	7/28/59
Stacking tray	Container Corp. of America	2,896,835	"
Carton with self-sealing end closures	Bergstein Packaging Trust	2,896,836	"
Severable frozen food carton	Edward J. Risucci	2,896,837	"
Box	Diamond Gardner Corp.	2,896,838	"
Diphenyl dispersions for the impregnation of paper	Monsanto Chemicals, Ltd.	2,897,111	"
Manufacture of bag tubes	St. Regis Paper Co.	2,897,730	8/4/59
Machine for making paper tubes	Christian Majer	2,897,731	"
Carton	Sutherland Paper Co.	2,898,028	"
Handled carton	Clark W. Sherman	2,898,029	"
Paper splicing machine	Kalamazoo Vegetable Parchment Co.	2,898,056	"
Manufacture of regenerated cellulose	International Paper Co.	2,898,222	"
Wax sized paper	Gulf Research & Development Co.	2,898,293	"
Folding machine	S & S Corrugated Paper Machinery Co., Inc.	2,898,818	8/11/59
Method of bonding paper having thermoplastic coating	Kalamazoo Vegetable Parchment Co.	2,898,973	"
Production of paper pulp from bagasse	Alfred M. Thomsen	2,898,994	"
Display carton	Dreier Brothers, Inc.	2,899,048	"
Carton for packaging paper cups	Multi-Carton Corp.	2,899,049	"
Bottle carrier	Owens-Illinois Glass Co.	2,899,051	"
Rotary pulp screens	Ben Cowan et al.	2,899,064	"
Device for screening pulp	The William Kennedy & Son Ltd.	2,899,069	"
Can carrier	Container Corp. of America	2,899,104	"
Dispensing carton	Michigan Carton Co.	2,899,119	"
Knock-down set-up boxes	Louise James	2,899,120	"
Folding box with partition	Central Fibre Products Co., Inc.	2,899,121	"
Partitioned carton	Ernie M. Schaefer	2,899,122	"
Carton	Decam Corp.	2,899,123	"
Manufacture of structural board from rumen	Swift & Co.	2,899,352	"

NEW PRODUCTS

These items are numbered for your convenience. Further information on the various products described may be requested at no obligation through our Readers' Service Dept. Use the business reply card in this issue.

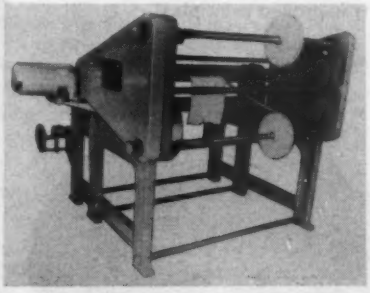
Molykote M-55 plus

A colloidal dispersion of sub-micron particles of molybdenum disulfide in mineral oil, M-55-plus has been recommended for extreme pressure application on drills, taps, cold metal forming dies, punches, etc.

Said to be suitable for slow moving parts under heavy loads and for surfaces which would be reactive with additives such as sulfur and chlorine, M-55-plus, with its ability to "plate itself out" on metal surfaces, is also recommended for important wear reduction applications in sleeve bearings and instrument gears.

Available in 2-oz. squeeze applicators, quarts and the conventional quantity shipping containers. *Alpha-Molykote Corp.*

Circle No. 1 on Readers' Service Card



Slitter rewinder

A duplex shear-type slitter rewinder (model CDH-40) is now available for paper, board, vinyl plastics, heavy duck and coated and rubberized fabrics up to 40 gauge. The unit, handling up to a 90-in. web, can be equipped with razor-blade or score-type slitters (as well as the standard shear-type slitters).

Unit features include a patented principle which permits each rewound roll to operate independently after slitting, thereby compensating for caliper variation and insuring uniform density. Standard models have edge guides and tension control and either a 4-speed, quick-change motor drive or Relience variable-speed drive. *Doven Div., Appleton Machine Co.*

Circle No. 2 on Readers' Service Card

Simplar multi-gravure press

This new press, which may consist of as many as 8 color stations with webs up to 60 in. in width, is reportedly capable of handling up to 30-point paperboard. Three models available: S-28; S-40; S-60.

Design and engineering techniques are said to have accomplished simplicity of operation and maintenance, minimum makeready, minimum scrap (makeready and running), manually controlled settings that can be duplicated without deviation, high speed production (1000 fpm), low maintenance, specially designed cylinder controls permitting operation of otherwise defective engravings, and maintaining uniformly spaced "eye" targets on rewind work. *Frank W. Egan & Co.*

Circle No. 4 on Readers' Service Card

Radial ball bearings

High-precision, heavy-duty, radial ball bearings are now available which, compared with Conrad-type bearings of equivalent size, are reported to have a greater load capacity (19 to 55 per cent) and greater rigidity (20 per cent less radial deflection).

Offered in ABEC-3 and ABEC-5 precision grades, the new bearings are made in metric sizes up to 85 mm. O.D. Standard material for rings and balls is 52100 steel. *Split Ballbearing Co.*

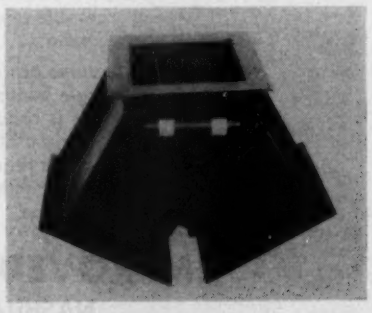
Circle No. 3 on Readers' Service Card

All-plastic pumps

Two polypropylene, centrifugal pumps, now available, are said to possess excellent resistance to solvents, greases, oils and many common acids and chemicals at high temperature.

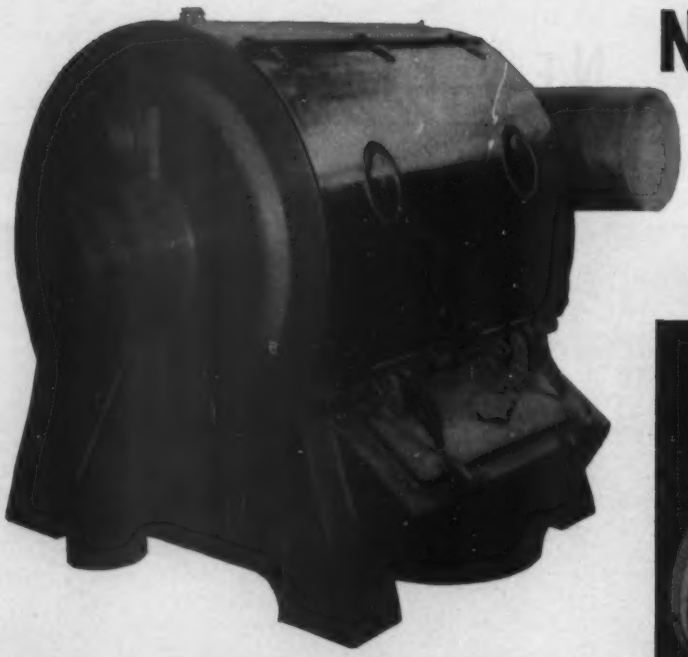
Capacity ranges are as follows: model ZP-25, 2 to 30 gpm; model ZP-35, 8 to 80 gpm. Both pumps are reported to be capable of handling solution temperatures up to 300° F. *Vanton Pump & Equipment Corp.*

Circle No. 5 on Readers' Service Card



Bifurcating gates

A new line of bifurcating gates, for diverting a stream of bulk material from



NEW ADVANCES IN LOW COST QUALITY PULP SCREENING

IMPCO CENTRIFUGAL SCREENS FOR:

Washed Stock Screening
Hot Stock Screening
Sealed Black Liquor Knotting
Fibre Length Classification
Paper Stock Cleaning

The new Impco Centrifugal Pulp Screen is the latest example of the progress made toward the ultimate in low cost quality screening. This screen incorporates many improved principles and features such as:

- — a stock inlet allowing direct top, bottom, front or rear infeeding which simplifies installation piping;
- — a tangential inlet which changes flow direction from linear to rotating, yet retains velocity head;
- — a special stator which provides uniform internal distribution of pulp;
- — a patented high-efficiency rotor which increases capacity without additional horsepower;*
- — a bottom accepted stock outlet permitting all sub-floor piping;
- — a full length quick-opening door for routine accepted stock sampling;
- — an accessible rejects outlet for tailings inspection or sampling.

These features are resulting in peak capacities and high discharge consistencies at lowest horsepowers. Reject richness is readily controlled. Engineered simplicity is characteristic of the entire line of Impco Centrifugal Screens which require very little operating attention and mechanical maintenance.

* U. S. Patent No. 2,845,848.

IMPROVED MACHINERY INC.

NASHUA, NEW HAMPSHIRE

In Canada, Sherbrooke Machineries Ltd., Sherbrooke, Quebec

For more data circle 144 on Post Card

New Products . . .

one direction to another, is now available.

Constructed with a removable side to facilitate cleaning, the gates are obtainable in stainless, galvanized or carbon steel. Standard size range is from 6 to 16 in. *Bucket Elevator Co.*

Circle No. 6 on Readers' Service Card

Cutter holder and cutter

Annular rings in rewound rolls of paper are said to be virtually eliminated by a newly designed, precision-machined cutter holder and cutter now furnished on this company's slitter and winders.

Equipped with a new type of locking device, this design is reportedly capable of being secured more tightly to the slitter shaft with no ensuing distortion of shape in "locking up". It also can be moved sideways on the shaft, as required.

The new cutter holders and cutter can be furnished for existing Langston slitter and winders. *Samuel M. Langston Co.*

Circle No. 7 on Readers' Service Card

Pipe-line crosses

Lined with Fluoroflex-T (tetrafluoroethylene resin), these type S crosses are reported to be immune to all acids, caustics, chlorides, solvents, bleaching solutions, peroxides and phenols at all concentrations from −100 to +500°F. A dynamically balanced rate of thermal expansion-contraction is maintained between the 150# ductile-iron housing and the inner wall of Fluoroflex-T, freeing it from the effects of thermal shock and fatigue stress.

Available size ranges are from 1 to 6 in. at present. The range will be extended up to 8 in. in the near future. *Resistoflex Corp.*

Circle No. 8 on Readers' Service Card

Sliding gate seats

Low flow, sliding gate seats are now available for regulators and control valves in sizes ranging from ¼ through 3 in. Not just a 40-per cent reduced trim, but for any individually required capacity, the 1¼-in. body, for example, can have capacities of 1¼, 1, ¾, ½, ⅜ or ¼ in.

Low flow seats are used where initial requirements are for a low flow but a high flow is needed later, full-line size valve strength is needed but low flow is required, and to replace seats in an oversized valve body.

Made of stainless steel with industrial hard chrome finish, these standard seats are self-lapping and self-cleaning in operation and give tight shut-off. *OPW-Jordan Corp.*

Circle No. 9 on Readers' Service Card

EC-1390

Developed for automatic spray application in volume production operations and for bonding a wide variety of porous and non-porous materials, EC-1390 is a high-strength, oil-resistant, elastomeric base adhesive. It produces high-strength laminates with such materials as plastic, thin-gauge aluminum and steel, linoleum, rubber, wood and other materials.

Typical uses include bonding aluminum facings to paper honeycomb cores in sandwich panel construction, bonding aluminum sheeting to tempered masonite table tops and bonding insulation material to galvanized steel for building panels. *Minnesota Mining & Mfg. Co.*

Circle No. 10 on Readers' Service Card

TMI Pen-A-Size tester

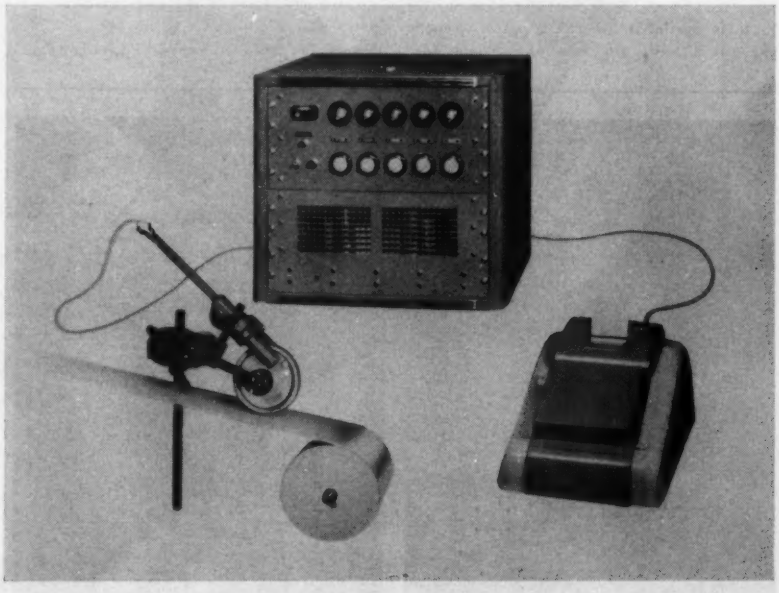
A photoelectric, penetration and sizing tester, now available, accurately and automatically measures the absorption of a colored liquid (usually a standard ink) into the test specimen. The TMI Pen-A-Size tester uses a well proven, patented system of balanced photoelectric cells in combination with a filter screen of known value. *Testing Machines Inc.*

Circle No. 12 on Readers' Service Card

Ultrasonic cleaner

Used filter elements can now be cleaned to their original differential pressure and dirt-holding capacities by means of an ultrasonic cleaning system.

Known as the Pall-Cavitron HIPS (HyperIntense Proximal Scanning), this unit is said to produce the maximum ultra-



Lineal footage counting system

A device for accurately measuring linear lengths of paper which is being gathered on the rewind roll, eliminates the hazardous practice of determining paper quantity by weighing.

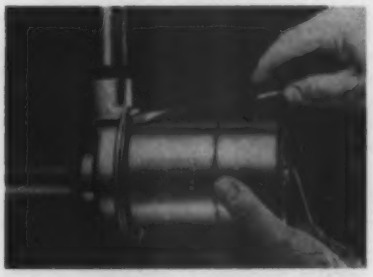
The measuring system is composed of a lineal footage actuator, a Post Decitron electronic counter, a decoder or translator that is housed in the same cabinet with the counter, a printer (see illustration), a paper-break detector and a control unit. Detector and control units are not illustrated.

This unique system has a reported measuring accuracy to within ±0.1 per cent. *Electronic Products Div., Post Machinery Co.*

Circle No. 11 on Readers' Service Card

sonic cleaning intensity that can be created in a liquid. The equipment places a hyperintense proximal field over a small portion of a filter's surface at one time; the filter element is rotated through this field until the surface is entirely cleaned. Dislodged particles are flushed away continuously. *Aircraft Porous Media Inc., a subsidiary of Pall Corp.*

Circle No. 13 on Readers' Service Card



Leak-proof pump

A new, low-cost, compact, leak-proof pump, developed for commercial and industrial use, is now available. Known as Dynapump model 420 D, the unit weighs less than 7 lb. and is reportedly capable of pumping over 800 gph. Rotor, shaft and impeller form a single assembly which is enclosed in a stainless-steel cylinder; thus, there is no stuffing box or mechanical seal to permit leakage.

The pump is designed to handle pressures to 150 psi and temperatures to 220° F. It is available for operation on either 115 or 220 v., single phase, 50 or 60 cycles. Automatic overload-cutout protection is provided. *Dynapump Div., Fostoria Corp.*

Circle No. 15 on Readers' Service Card

Aluminum roof coating

Fundamentally a coating for renovating old composition roofs, this product covers cracks and small holes, protects the dried-out felt base, insulates by reflecting the sun's rays and produces a bright, attractive appearance.

The asphalt-based aluminum coating will be available in 5-gal. cans, either fibrated or unfibrated. *Barrett Div., Allied Chemical Corp.*

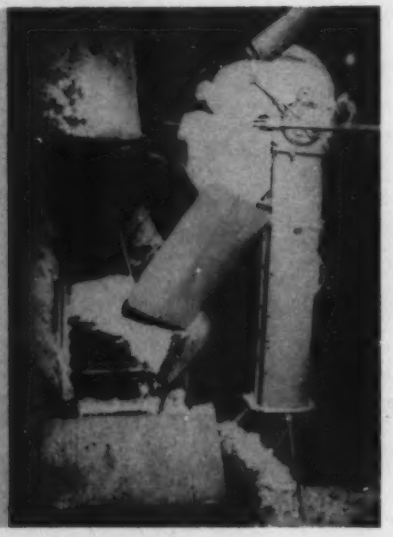
Circle No. 16 on Readers' Service Card

Cavcocide

A stable liquid solution, Cavcocide produces chlorine dioxide in acidic pulp and paper mill process waters. Metered directly from the shipping container into the wet end of the paper machine system, it is said to provide the complete biocidal action of chlorine dioxide throughout the white water system.

Imparting no odors or additives to finished paper, Cavcocide is non-toxic and non-irritating. Reportedly producing no side effects or reactions on fiber, color pigment, felts or wires, in the dilutions required for germicidal effectivity, it promotes increased felt drainage and clean, deposit-free stock lines and machine surfaces. *Cavedon Chemical Co. Inc.*

Circle No. 17 on Readers' Service Card



Sawdust weigher and recorder

A continuous weigher and recorder of wood-chipper sawdust, now available, keeps wood costs down. Lowered chipper efficiency may be quickly determined by this device which keeps an accurate measurement of the sawdust produced.

The unit is V-belt driven with a 2-in. motor pulley and a 14-in. drive pulley. It is powered by a ¼-hp, 1700-rpm motor and is reported to be capable of handling up to 300 lb. of sawdust per minute. Sawdust flows in the top and out the bottom. *Northern Lakes Forest Products.*

Circle No. 14 on Readers' Service Card

High-capacity disintegrator

The model RP Angle Disintegrator, now available, is a low cost, high-capacity unit. Exceptionally compact (the rotor is directly connected to a variable-speed motor, thus eliminating the need for belts and costly belt-replacement down time), the disintegrator is equipped with 360° screens.

Ease of changing both the motor's speed and screen size quickly adapts the unit to the process operations of grinding, mixing and blending of a wide variety of wet or dry materials. The machine opens fully to allow cleaning of all parts. Obtainable in 3 sizes; stainless-steel construction. *Rietz Mfg. Co.*

Circle No. 18 on Readers' Service Card

Vonarx air gun

A new method of de-rusting, cleaning and de-scaling of a wide variety of materials and surfaces is now available. The Vonarx air gun, a Swiss-made product, has been reported to be successful in cleaning weld seams, castings, stone, removing plaster, chiseling out pipe channels, raking joints, stripping paint, etc.

Operating on compressed air from any industrial-type compressor, the air gun has a series of hardened steel needles at its head. A spring loaded recoil movement of the needles, which operate independently from each other to allow adjustment to the surface being cleaned, is controlled by a trigger on the handle.

Normal working air pressure is 88 psi and air consumption is 12.5 cu. ft./min. Weights are: Model 2B, 5½ lb.; 3B, 8½ lb.; 4B, 13 lb. *Swissair Tool Corp.*

Circle No. 19 on Readers' Service Card

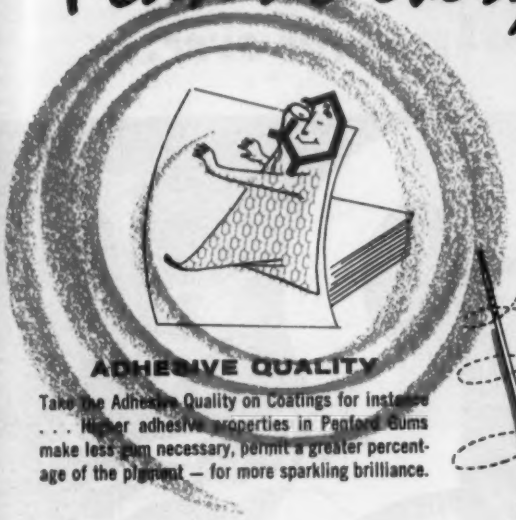
Three polyethylene resins

These newly developed, low molecular weight, polyethylene resins are designed to fit a growing list of prospective uses in rubber, coatings, polishes, textile finishes, and in plastic molding and extrusion compounds.

Epolene LVE, an emulsifiable, low viscosity type of polyethylene, may be used as a sizing agent for textiles, in emulsion paper coatings and as a paraffin modifier to improve coating adhesion and heat stability, etc.

Epolene HDE, said to be the highest density, low molecular weight, emulsifiable polyethylene on the market, deposits an extremely hard film when used in self-polishing floor polish formulations.

I can do everything better...



ADHESIVE QUALITY

Take the Adhesive Quality on Coatings for instance . . . Higher adhesive properties in Penford Gums make less gum necessary, permit a greater percentage of the pigment — for more sparkling brilliance.

IMPROVED PIGMENT DISPERSING PROPERTIES

Or, in Dispersing Pigments . . . Improved properties make Penford Gums exceptionally strong dispersing agents for pigments.

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GOOD LEVELING PROPERTIES

And where Good Leveling Properties are desired . . . Penford Gums' water holding ability makes sure that the coating remains on the surface longer—permits the coating to be leveled uniformly without lumping or crowfooting.

Call or write our Technical Service Department today for suggestions how you can add versatility to your coatings.

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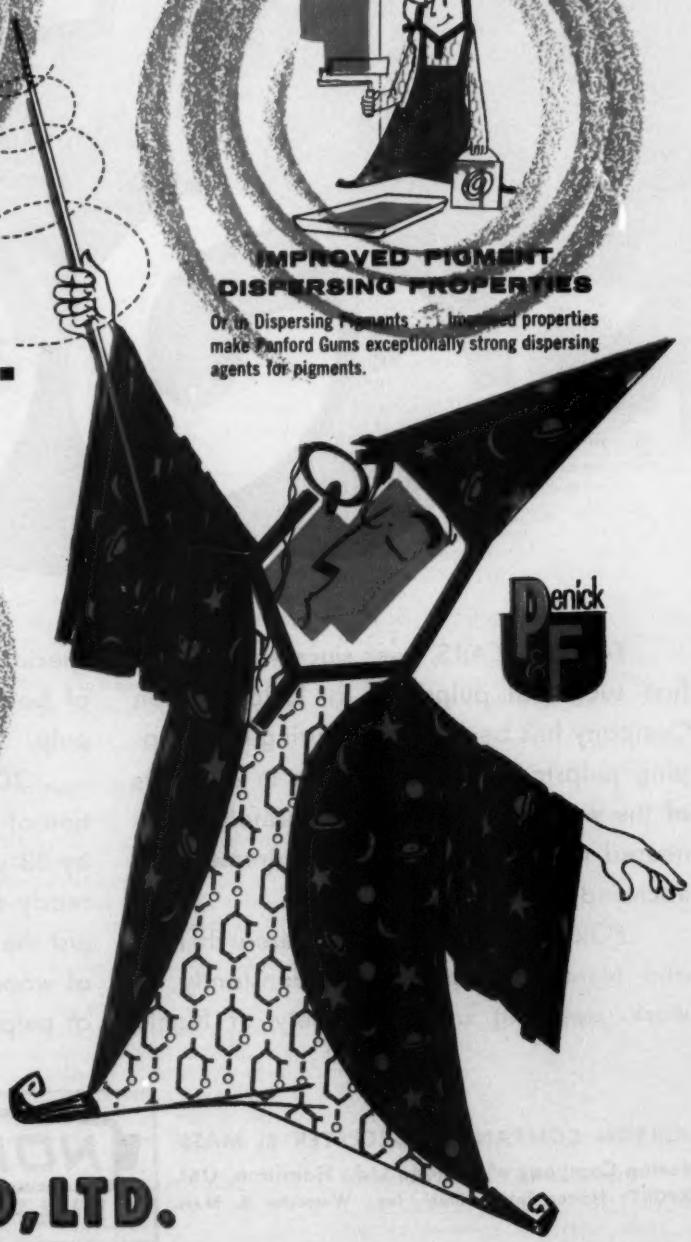

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the world's standard for mechanical pulp — *for over...*

FOR 33 YEARS, ever since we built the first successful pulpstone in 1926, Norton Company has been manufacturing and shipping pulpstones to paper mills in all parts of the world. Each has been carefully engineered to meet the special requirements of each individual mill.

FOR 33 YEARS, Norton research men and technicians have been constantly at work, applying a wide variety of highly specialized knowledge to the development of better pulpstones for better mechanical pulp.

TODAY, a world-wide service organization of Norton pulpstone engineers, backed by 33 years of pulpstone experience, stands ready to study your mill and to recommend just the right Norton pulpstone for your type of wood, your type of grinder and the type of pulp you want to produce.

NORTON COMPANY, WORCESTER 6, MASS.
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NORTON PULPSTONES

Abrasives—Grinding Wheels
Refractories—Electro-Chemicals
Machine Tools—Non-slip Floors

75 years of . . . Making better products . . . to make your products better

For more data circle 146 on Post Card

New Products . . .

Epolene HD, the hardest type, possesses low viscosity and is non-emulsifiable. Useful in printing ink applications because of its exceptional hardness, it can be ground with ink vehicles into a fine dispersion which is stable and has little tendency to separate from the vehicle. *Eastman Chemical Products Inc., Subsidiary, Eastman Kodak Co.*

Circle No. 20 on Readers' Service Card

Surface-active agents

With the addition of alkyl phenol-based ethylene oxide condensates, this company is expanding its line of non-ionic, surface-active agents. Interim production of dodecyl and nonyl phenol-based products has been started at two of the company's plants; commercial production has been scheduled for February, 1960.

The new products will be marketed as a part of the company's Sterox line. *Inorganic Chemicals Div., Monsanto Chemical Co.*

Circle No. 21 on Readers' Service Card

Fork-lift truck

The "FT Stacker" is a three-wheel, fork-lift truck with a reported capacity of 17 tons. Forks of the new "FT" machine are 5 ft. long and can hoist loads to 16 ft. above the ground. It is available with or without "tusks" (for gripping loads); kicker chains (for ejecting loads) are also optional.

Generators, under the hood, are powered by a 195-hp. diesel engine. Simple electric switches and potentiometers govern all work functions. *R. G. LeTourneau Inc.*

Circle No. 22 on Readers' Service Card

Paper-making chemical

Sumstar, an organic chemical made from starch, is a polymeric dialdehyde which gives both wet and dry strength to paper. It also may effect favorably such characteristics as oil and grease resistance, tensile strength, elongation, stiffness and porosity.The chemical can be used in paper sizing and as an adjunct in binders for paper coatings.

Colorless and odorless, Sumstar is a non-volatile fine powder reportedly having an extremely low acute toxicity. Available in three types: 50-per cent oxidized; 75- to 80-per cent oxidized; 90-per cent and over oxidized. *Miles Chemical Co.*

Circle No. 24 on Readers' Service Card

Compaction trailer

A new hydraulic compaction trailer for reducing the volume of paper plant waste, wood chips and refuse, is now available in 2 sizes. Model DB-42 has a loose-refuse capacity of approximately 160 cu. yd. and dimensions (LH) of 34 ft., 7 in. by 10-2/3 ft. Model DB-53 will hold approximately 210 cu. yd. of loose refuse and has dimensions (LH) of 34 ft., 7 in. by 12½ ft.

The compacting operation of the trailer is completely hydraulic. The packing mechanism moves with a 65,000-lb. thrust. An 18-gal. sump at the front of the trailer gathers liquids when wet refuse is compacted. *Dempster Bros.*

Circle No. 23 on Readers' Service Card

Paper salvage cutter

A hydraulically operated, guillotine-type cutter, now available, eliminates the use of hand axes and chain saws in preparing large paper rolls for reclamation.

Known as the KBWS-55, the new machine is reportedly capable of receiving 6-ft. dia. by 52-in. wide paper rolls and other material. A double slotted bed makes it possible for a lift truck to deliver a paper roll directly into the cutting area and stay in position during the cutting operation. The unit is equipped with a 55-in. long blade which rides on 14-ft. vertical shafts. Powered by a 10-hp motor, the KBWS-55 has a knife stroke of 66 in. with an over-all blade pressure of 30,000 lb. *Black Rock Mfg. Co.*

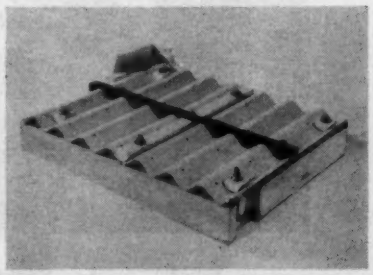
Circle No. 25 on Readers' Service Card

Pyrometer system

Sensitivity at low temperatures, direct-reading charts and scales, interchangeable head units and automatic, ambient, temperature compensation are some of the unique features of the new Bristol Velotron low-range pyrometer system.

This system is reportedly capable of measuring temperatures in ranges from 0° F. to 200° F. and up to a maximum of 1100° F. It is especially applicable for temperature measurement, recording and control, with such products as rubber, synthetic rubber, tiles, adhesives, cast aluminum, synthetic and natural fibers, paper, plastics, chemical flows, web-process products, etc. *Bristol Co.*

Circle No. 26 on Readers' Service Card



Underdrain for sand filters

Corru-Drain, a patented, non-corrosive underdrain design for rapid filters, is unique in that it is made of corrugated asbestos-cement sheets with the corrugations forming the laterals. It is designed for applications where large flows call for

ANOTHER NEW PAPER MACHINE BY. VALLEY

From the Inlet to the Reel, Gilbert's new machine incorporates the latest in design with maximum built-in flexibility.

for your paper machine requirements consult... VALLEY

GILBERT PAPER COMPANY'S NO. 2 MACHINE

"the Valley Queen"

To produce Gilbert's famous Cotton Fiber Content papers in such grades as bond, index, ledger, drawing, currency, cover, manuscript, tracing, and specialty grades.

The newly designed Valley Horizontal Breaker Stack, the new Valley Horizontal Size Press, and the new Valley Horizontal Track Surface wind Reel are examples of Valley's increasing progress and service to the Industry.

VALLEY IRON WORKS CORPORATION

SUBSIDIARY OF ALLIS-CHALMERS MANUFACTURING COMPANY

APPLETON, WISCONSIN

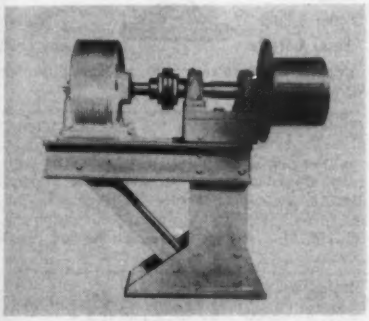
For more data circle 147 on Post Card

New Products . . .

rectangular or square concrete gravity filters.

With many advantageous features which include light weight, toughness, ease of shipping, handling and simplicity of installation, Corru-Drain sheets are only 1½ in. high. *Graver Water Conditioning Co.*

Circle No. 27 on Readers' Service Card



Pneumatic brake

A pneumatic brake has been developed and marketed for use on this company's complete line of shaftless backstands. Said to achieve better tension control, the brake and shaftless backstand combination is reported to have been used successfully with a 120-in., 72-in. dia. face roll (approx. roll weight: 7 tons). *Hamblet Machine Co.*

Circle No. 28 on Readers' Service Card

Four-color press

A stack-type, flexographic press, designed and built to the highest converting standards, features two, three and four printing units on a four-color frame. There is a 42-in. drying distance between colors; the unit may be used in a variety of widths (to 42 in.). This new, high-speed press also features a completely enclosed fountain, variable speed control of ink rolls and a running register control in all directions. *Faustel Inc.*

Circle No. 29 on Readers' Service Card

Temperature controller

The Unichannel On-Off Thermistor temperature controller, model 8251-203, has all circuitry (with the exception of tubes and relay) completely encapsulated in epoxy plastic.

This low-cost unit, used on a wide variety of applications which require close temperature control, comes with a load relay rated at 25 amp., 230 v. and has a reported control stability to ±1° F. Two standard temperature ranges of 200 to 600° F. and 0 to 200° F. are available. *Electronic Processes Corp. of Calif.*

Circle No. 30 on Readers' Service Card

NEW LITERATURE

Manufacturers' Publications

These items are numbered for your convenience. Copies of the publications may be requested at no obligation through our Readers' Service Dept. Use the handy business reply card which accompanies this issue.

Forming boards, deckles and deflectors

Sandy Hill Iron & Brass Works has released a 4-page brochure that shows various features of several basic types of forming boards, deckles and deflectors. The company's products are explained in text and photographs with the addition of many diagrams which give design features.

Circle No. 31 on Readers' Service Card

Estimating dye formulas

Sandoz Inc. has published an original paper by A. D. Whitfield, of their paper laboratory. The paper is concerned with the "Conversion of laboratory dye formulas, as determined from hand sheets, to recommended mill formulas." The various considerations from the viewpoints of a paper laboratory and the practical problems faced by a functioning paper mill are presented in a meaningful manner.

Circle No. 32 on Readers' Service Card

Air processing equipment

J. O. Ross Engineering, a division of Midland-Ross Corp., is offering a new, 12-page bulletin which includes data on such equipment as ovens, dryers, air heaters and curing systems. Applications are found in such industries as pulp and paper, paint finishing, rubber and foam rubber, foundries, plastics and chemical processing. The bulletin also includes 6 specific case histories which cover tough drying or curing problems solved by properly engineered equipment.

Circle No. 33 on Readers' Service Card

Products bulletin

Photovolt Corp. welcomes your request for their 4-page bulletin which contains condensed information on photoelectric and electronic measuring instruments. The corporation's complete manufacturing program is presented. A partial list of contents includes pH meters, colorimeters, hemoglobinometers, reflection meters, electronic and multiplier photometers, footcandle meters, and exposure photometers for photomicrography and metallography, etc. Specific instrument models are illustrated throughout.

Circle No. 34 on Readers' Service Card

Sectional belt conveyors

Link-Belt Co. has released a new 40-page handbook on the use and selection of standardized Pre-Bilt sectional belt conveyors, adaptable to a large proportion of belt-conveyor applications and operating conditions. Twenty-two components and accessories are listed, as well as engineering and selection data.

Circle No. 35 on Readers' Service Card

Control device catalog

General Electric Co. has published a new 72-page catalog that contains information on the complete line of control devices manufactured by their general purpose control department. Available upon request, the illustrated catalog includes horsepower selection charts for motors from ¾ through 200 hp., complete product description of motor starters (both manual and magnetic), contractors, relays, solenoids, limit switches, etc. Features, wiring diagrams, dimensions and application information for each device are also included. Appropriate GE handbook section and available supplemental bulletins are listed for each product type.

Circle No. 36 on Readers' Service Card

Synthetic organic chemicals

Union Carbide Chemicals Co., a division of Union Carbide Corp., has just published the 1960 edition of their physical properties booklet. Describing more than 400 synthetic organic chemicals, the 26-page booklet contains information on applications, physical properties and shipping data.

Circle No. 37 on Readers' Service Card

Systems catalog

Rust-Oleum Corp. is offering a new 38-page systems catalog which contains comprehensive information on rust and corrosion control through the use of protective coatings. In addition to the description of Rust-Oleum's many types of protective coating systems, the catalog includes 76 full-color application photographs and 110 color chips, to show actual colors. A technical data section gives complete information on surface preparation, type of surfaces, application techniques, how to estimate gallonage needed for various sizes and shapes, mixing and thinning, etc.

Circle No. 38 on Readers' Service Card

Catalog 953

Jeffrey Mfg. Co. is offering a comprehensive, 32-page book that covers electric and mechanical vibrating-type coolers and dryers of both the direct and indirect type. A section is included on auxiliary equipment in the vibrating line such as feeders, packers, conveyors, etc. Another section outlines a pilot-unit rental system; a system which permits firms to simulate actual production conditions in their own plant. The catalog makes abundant use of drawings, photographs and specifications, as well as material weight charts.

Circle No. 39 on Readers' Service Card

Butterfly valves and operators

Darling Valve & Mfg. Co. welcomes your request for their 32-page catalog on Darling-Pelton rubber seated butterfly valves. Contents include data on construction and design, dimensions, directions for ordering, general hydraulic data and materials and methods of operation. Many diagrams and sketches are included, in addition to graphs, specification tables and cut-away photographs showing design features.

Circle No. 40 on Readers' Service Card

IGEPAL surfactants

General Dyestuff Co., a sales division of General Aniline & Film Corp., welcomes your request for their 22-page booklet which describes a variety of applications of IGEPAL surfactants in the manufacture of pulp and paper. The booklet lists 4 IGEPAL surface-active agents and describes their uses in various phases of pulp manufacture (including cooking, washing, de-resination and bleaching), in paper and paperboard manufacture, in the washing of

POSTERS — A POTENT SAFETY TOOL

Posters should be one of the top aids in your safety program. No other safety medium can reach your entire audience—not once, but many times each day—with such low-cost safety messages. They are directed at the worker acts and worker attitudes that lead to accidents. Posters lend *timeliness, repetition and continuity* to your safety program . . . the three fundamental principles of direct selling.

The National Safety Council maintains a stock of posters that covers all industries, operations and phases of safety and health. These posters are produced in two sizes: "A" size, 8½"x 11½", and "B" size, 17x23". Their colorful illustrations and eye-catching captions make them ideal for the mass selling of safety.

Write for a free copy of the Directory of Occupational Safety Posters. This 72 page catalog illustrates 744 posters, indexed and classified for specific operations.

NATIONAL SAFETY COUNCIL

425 N. Michigan Ave.

Chicago 11, Illinois

For more data circle 148 on Post Card

woolen paper-machine felts, de-inking of paper and the stripping and cleaning of rag stock. In addition to outlining the chemistry and general properties of these surfactants, the text incorporates sketches, washing-equipment-design charts and felt-washing formulations.

Circle No. 41 on Readers' Service Card

Fatty acids from crude tall oil

Hercules Powder Co. has published a 20-page technical booklet, available upon request, which describes fatty acids made from crude tall oil. Technical data on the composition and physical properties of "Pamak" fatty acids are supplemented with tables and figures. A discussion is included on applications in protective coatings, core oils, plasticizers, cleaners, detergents, driers and asphalt additives, etc. Pertinent information is given on shipping, storing and handling.

Circle No. 42 on Readers' Service Card

Reprint and packaging material folders

Vanant Co. Inc. will honor all requests for two folders; the first, a magazine editorial reprint and the second, a brochure on Sus-Rap. The illustrated reprint deals with solutions to modern packaging and shipping problems. The four-page brochure, by text and illustration, shows some of the many applications of Sus-Rap, a preformed fibre-board, wrap-around packaging material.

Circle No. 43 on Readers' Service Card

Rigid PVC products catalog

Kaykor Industries Inc. welcomes your request for their new catalog which describes properties and applications of rigid polyvinyl chloride products. The 23-page catalog contains many illustrative diagrams, tables and photographs.

Circle No. 44 on Readers' Service Card

Condensate flow regulator

Stickle Steam Specialties Co. welcomes your request for their bulletin on the series 300 micro-adjustable orifice. Tables furnished with the illustrated bulletin which describes this new-type condensate flow regulator, give the capacity of condensate handled under different pressure differentials and other conditions.

Circle No. 45 on Readers' Service Card

Equipment handbook

Precision Equipment Co. is offering free, one-year subscriptions to their pocket-sized equipment manual. Prepared as an aid to executive planning, this quarterly publication contains illustrations and descriptions of the newest products and inventions for use in the factory and office. Subject matter includes safety equipment, new office aids, equipment for increasing plant efficiency, new materials handling devices, etc.

Circle No. 46 on Readers' Service Card

Ball valves

Jamesbury Corp. is offering an illustrated, four-page brochure which, in addition to a detailed description of their ball-valve line, lists over 40 applications to pulp and paper mill operations. Specifications and dimensions for valves ranging in size from ¼ to 10 in. are included in the brochure.

Circle No. 47 on Readers' Service Card

New catalog "D"

Paul O. Abbé Inc. has just published catalog "D" which gives technical data and specifications of the complete line of mass & paste mixers and ribbon mixers. The 12-page bulletin, available on request, contains illustrations of equipment, various blade designs and arrangements, etc.

Circle No. 48 on Readers' Service Card

Non-toxic adhesive data

Borden Chemical Co., a division of Borden Co., has announced the availability of a new list of approved, non-toxic adhesives for packaging applications. The list includes a series of resin based emulsion glues that are specially designed for convolute- and spiral-wound food containers. This would include containers used for hot and cold beverages, meats, dairy products, drinking straws, etc. Food clearance data from independent testing laboratories are available upon request.

Circle No. 49 on Readers' Service Card

Protective coating chart

Carboline Co. is offering a 4-page chart which compares protective coating systems for concrete floors. The chart shows (by columns) the resistance of each system to chemicals, thermal shock, abrasion and temperature. It also gives the compressive strength, impact resistance, skid-proof qualities, thickness, and cost per sq. ft. of the individual systems. The ratings of unprotected concrete are included.

Circle No. 50 on Readers' Service Card

"SVS"

T. B. Wood's Sons Co. welcomes your request for their 8-page, 2-color bulletin that both pictures and describes new stationary control, "SVS" variable-speed sheaves for standard V-belts. Construction and installation features are given in addition to an exploded view which shows and labels the various components. "Sure-Grip" companion sheaves and "Quick-Slide" motor bases are also covered.

Circle No. 51 on Readers' Service Card

Slip & friction tester

Testing Machines Inc. welcomes your request for their 2-page brochure which illustrates the TMI slip and friction tester. The brochure describes the processes involved for testing the slip and friction characteristics and qualities of paper, paperboard and corrugated medium.

Circle No. 52 on Readers' Service Card

Valve catalog

Lunkenheimer Co. has just released a newly revised version of its 500-page valve catalog. In addition to the more than 100 pages of engineering data, the catalog features an illustrated, thumb-indexed, 24-page valve selector guide which groups valves according to pressure classifications; specifications, reference data and code requirements for any Lunkenheimer valve can be found quickly.

Circle No. 53 on Readers' Service Card

Industrial application bulletin

Devcon Corp. is offering an illustrated, 8-page bulletin that describes how manufacturers have saved time and reduced costs in their tooling programs by using Devcon materials. Employing case histories, the bulletin gives details of successful applications of "Plastic Steel" and other products in the making of jigs, fixtures, metal forming dies, duplicating masters, etc.

Circle No. 54 on Readers' Service Card

The Paper Industry Professional and Business Services

J. E. SIRRINE COMPANY

ENGINEERS Since 1902

GREENVILLE, SOUTH CAROLINA

Design — **Consultations**

Paper & Pulp — **Reports**

Water & Waste — **Appraisals**

Steam & Hydro Power — **Steam Utilization**

SALES REPRESENTATIVE

Paper Machine Clothing, For Mid-West

Leading manufacturer of paper machine clothing interested in a top quality man for sales in Mid-western states. Experience and close connections with paper mill personnel very important. Age range 30 to 40 preferred, salary and bonus basis. Apply giving educational background, work experience with paper industry and relevant personal data to Box 695, The Paper Industry.

RETIRING?

Add to your retirement income by making your paper mill knowledge pay off. Spare time. No selling. Write Box 690, The Paper Industry.

PRODUCTION CONTROL MAN WANTED

St. Regis Division requires A-1 paper man with mill or converter experience in Production Control. Excellent opportunity. Salary commensurate with background and capabilities. Experience in centralized scheduling particularly helpful. Send brief resume to The Gummed Products Company, Division of St. Regis Paper Company, Troy, Ohio, Attention: Production Manager; or phone direct for an interview appointment.

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of the United States

42" x 58", printed in black and two colors

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Published by FRITZ PUBLICATIONS INC.

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GET THE SCOOP ON SCOOPS

If you have a dryer drainage problem, don't do anything about it until you see the movie—

"Condensate Behavior in Rotary Dryers"

This 15 minute sound color film shows what goes on inside a dryer at a wide range of speeds . . . shows why conventional syphons lose efficiency at higher speeds . . . shows how to get condensate out at any speed. For a showing, contact your Armstrong Representative or write direct.

ARMSTRONG SYPHON SCOOPS

ARMSTRONG MACHINE WORKS

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Manufacturers of Armstrong Inverted Bucket Steam Traps

For more data circle 149 on Post Card

Six Publications for Papermakers

Paper and Paperboard Making (Williamson)	6.00
Technology of Paper Coating	2.00
Lessons in Papermaking—Part 1	1.50
Lessons in Papermaking—Part 2	1.50
Notes and Observations on Beaters	1.00
Trouble on the Paper Machine	.75

Mail your order with payment to:

***The* PAPER INDUSTRY**

431 S. Dearborn Street, Chicago 5, Illinois

Carthage-Norman Chippers Give You Greater Yield of Higher Strength Pulp

With its unique helicoidal disc segments and variable-bevel knives, the Carthage-Norman Chipper produces the highest percentage of "to size" chips. There are fewer compressed or bruised chips and ½% to 1% less sawdust — a feature which can pay for the chipper in one year. Knives wear longer — cost less. Heavy-duty construction results in exceptionally low maintenance costs.

SEND THE COUPON TODAY

CARTHAGE MACHINE CO.
CARTHAGE, NEW YORK

Please send full details showing why a Carthage-Norman Chipper will give me a greater production of uniform, clean-cut, "to size" chips.

Name.....

Firm.....

St. or Rd......

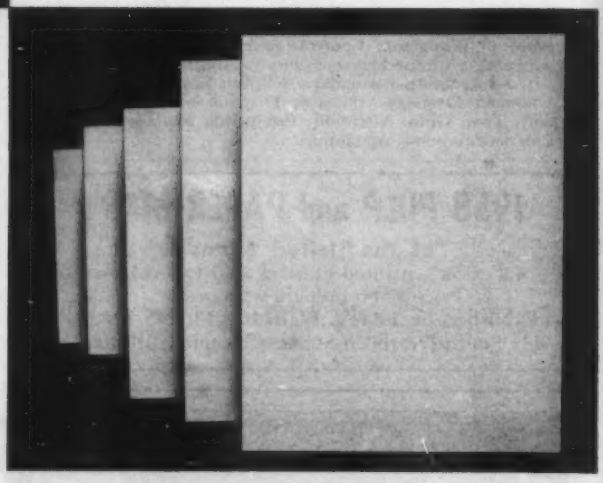
City..... *Zone*.... *State*.....

D

For more data circle 150 on Post Card

CLEANER FIBERS....

CLEANER PAPER....



WHEN YOU DE-INK WITH...

d-i LESTOIL LIQUID DETERGENT

Yes, d-i LESTOIL assures you of cleaner, more flexible fibers, a cleaner, better quality sheet with more uniform color from all grades of raw stock . . .

. . . because d-i LESTOIL thoroughly wets out the stock, dissolves, emulsifies and disperses ink, grease, wax, asphalt and adhesives . . . makes them miscible with water.

LESTOIL destroys the adhesive qualities of contaminants and prevents their redeposition in fibers, on wires and felts, or elsewhere in the system. d-i LESTOIL keeps your whole system clean and free-flowing . . . the result, a cleaner sheet!

FREE, a generous sample of d-i LESTOIL and full details — yours for the asking. Write today

P.S. d-i LESTOIL is ideal for washing felts, too—on or off the machine.

LESTOIL, INC.

92 Garfield Street
HOLYOKE, MASS.
a subsidiary of Adell Chemical Co.

For more data circle 151 on Post Card

MARKET QUOTATIONS

RAGS (Domestic)

New Cotton Cuttings

The following are brokers' and large dealers' average buying prices for sizeable lots in cents per pound f.o.b. New York:

	per cwt.	
No. 1 white shirt cuttings	13.00—	13.50
Soft unbleached muslins	15.50—	16.00
Fancy shirt cuttings	4.50—	5.00
No. 1 percales	5.50—	6.00
No. 1 washables	2.25—	2.50
No. 1 light silesias	6.50—	7.00
No. 1 light prints	4.75—	5.00
Light flannelettes	6.50—	7.00
Cottonades	2.75—	3.25
Blue overall cuttings	6.75—	7.25
Blue cheviots	6.75—	7.25
Canton flannels, bleached	10.50—	11.00
Canton flannels, unbleached	10.50—	11.00
Osnaburg cuttings	9.50—	10.50
Underwear cuts, bleached	14.50—	15.00
Underwear cuts, unbleached	14.50—	15.00
Sun tan khaki cuttings	5.00—	5.50
American linen cuttings	6.75—	7.25

Cotton Rags

The following are prices, cents per pound, paid by dealers and brokers f.o.b. New York:

	per cwt.	
No. 1 roofing (Chicago)	.60—	.65
No. 2 roofing (Chicago)	.50—	.55
Twos and blues, repacked	1.50—	1.75
Thirds and blues, repacked	1.50—	1.75
No. 1 whites, repacked	—	
No. 1 whites miscellaneous	—	
No. 2 whites, repacked	—	
No. 2 whites, miscellaneous	—	

RAGS (Foreign)

(ex dock New York City)

New Rags

per cwt.

Nominal:
- New dark cuttings
- New mixed cuttings
- New light silesias
- Light flannelettes
- Unbleached cuttings
- New white cuttings
- New light oxfords
- New light prints

Old Rags

per cwt.

Nominal:
- No. 1 white linens
- No. 2 white linens
- No. 3 white linens
- No. 4 white linens
- No. 1 white cottons
- No. 2 white cottons
- No. 3 white cottons
- No. 4 white cottons
- Extra light prints
- Ordinary light printe
- Medium light prints
- Dutch blue cottons
- French blue cottons
- French blue linens
- Checks and blues
- Linsey garments
- Dark cottons
- Old shopperies

ROPE and BAGGING

F.o.b. and ex dock New York City

Gunny No. 1, domestic	—
Gunny No. 1, foreign	—
No. 1 manila rope, domestic	—
No. 1 manila rope, foreign	—
New burlap cuts (soft)	—
Sisal strings	—
Mixed strings	—

WASTE PAPER

The following are prices, dollars per net ton, paid by brokers and large dealers for carload quantities of baled stock, f.o.b. cars New York:

No. 1 hard white envelope cuttings	90.00—100.00
No. 1 hard white shavings	75.00— 80.00
No. 1 soft white shavings	50.00— 55.00
Soft white shavings, uncoated	60.00— 65.00
Fly leaf shavings No. 1	30.00— 35.00
Fly leaf, woody, No. 1	25.00— 27.50
Mixed colored shavings	21.00— 23.00
No. 1 books and magazines	24.00— 25.00
Ledger stock, white, No. 1	45.00— 50.00
Ledger stock colored, No. 1 (Midwest ship)	40.00—
New manila envelope cuttings (free of groundwood)	70.00— 75.00
New manila envelope cuttings (containing groundwood)	50.00— 55.00
Manila tab cards	75.00— 80.00
Colored tab cards	55.00— 60.00
New northern kraft envelope cuttings	65.00— 70.00
Triple sorted kraft, 100%	35.00— 37.00
No. 1 old kraft	30.00—
White news cuts, No. 1	55.00— 57.50
No. 1 overissue news	17.00— 19.00
Folded news, special	15.00— 16.00
Folded news, ordinary	13.00— 14.00
Old corrugated boxes	20.00— 21.00
New jute corrugated cuts	19.00— 20.00
Mill wrappers	11.00— 13.00
Boxboard cuttings	4.00— 5.00
No. 1 mixed paper	6.00— 8.00

CHEMICALS

F.o.b. New York City

Alum, ammonium	
Granular, bags, works, cwt.	4.30—
Lump, drums, works, cwt.	5.05—
Powdered, drums, works, cwt.	5.20—
1-Arginine, drums, kilo	90.00—
Blanc Fixe	
Direct process, bags, c.l., works, ton	145.00—
L. c. l., ton	155.00—
Bleaching Powder, drums, cwt.	—
Casein, domestic acid precipitated	
30-mesh bags, 10,000-lb. lots or more, shipping point, lb.	.56—
80-mesh bags, 10,000-lb. lots or more, shipping point, lb.	.64—
China Clay, domestic dry-ground, airfloat, 99%	
325-mesh bags, c.l., Georgia works, ton	10.00— 12.00
300-mesh bags, c.l., Georgia works, ton	13.50— 14.50
Imported, white, lump, bulk, c. l., ex dock Phila, Portland, Me., gross ton	20.00— .35.00
Chlorine, liquid	
Tanks, single units, works, freight equaled, cwt.	3.15—
Glycerine, refined (CP, USP) 99%, drums c. l., delivered lb.	.30⅞—
Litharge, commercial powdered	
Barrels, c. l., works, freight equaled lb.	.13¾—
Rosin, gum, c. l., f.o.b. New York, cwt.	
K, M	13.20—
N	13.40—
WG	13.70—
WW	14.00—
Rosin, wood, c. l., f.o.b., shipping point, cwt.	
K, M	10.15— 10.40
N	10.35— 10.60
WG	10.55— 10.80
WW	10.88— 11.10
Saltcake, domestic, bulk works, 100% Na_2SO_4 basis ton	28.00—
Soda Ash	
Dense, 58%, paper bags, c.l. works, cwt	1.90—
Light, 58%, paper bags, c.l. works, cwt	1.85—
Soda, caustic	
Flake, 76%, drums, c. l. works, freight equalled, cwt	5.20—
Solid, 76%, drums, c. l. works, cwt.	4.80—
Sodium Silicate	
40°Be, 1:3.2, turbid, drums, c. l., works, cwt.	1.65—
52°Be, turbid, 1:2.4, drums, c. l., works, cwt.	2.65—
Starch	
Pearl, 140-lb. bags, cwt.	7.51—
Pearl, 100-lb. bags, cwt.	7.36—
Powdered, 100-lb. paper bags, cwt.	7.48—
Sulfur, crude	
Bulk, c. l. mine, contract, long ton	23.50—
Talc	
Domestic, fibrous, N. Y., grd., bags, c. l. works, ton	28.00—
Canadian, ground, bags, c. l. works, ton	20.00— 35.00
Titanium Pigment	
Calcium-rutile base, regular, bags, c. l., lb.	.09⅜—
High-tinting, drums, c. l., lb.	.14⅜—
Zinc Oxide Pigment, American process	
Lead-free, bags, c. l. freight allowed, lb.	.14½—
Leaded, 35%, bags, c. l., freight allowed, lb.	.15⅛—

WOOD PULP

Quotations on domestic and Canadian pulp, dollars per short air-dry ton delivered consuming mills including basic allowances, follow:

Bleached sulfite, No. 1	155.00—
Bleached sulfite, Canadian	155.00—
Unbleached sulfite	135.00—
Unbleached sulfite, Canadian	135.00—
Bleached soda	150.00—
Bleached soda, Canadian	150.00—
Kraft, bleached hardwood	152.00—
Kraft, bleached	157.00—
Kraft, bleached southern	160.00—
Kraft, bleached Canadian	160.00—162.50
Kraft, unbleached southern	120.00—
Kraft, unbleached, Far West	125.00—
Kraft, unbleached Canadian eastern	135.00—
Kraft, unbleached Canadian western	120.00—125.00
Kraft, semi-bleached southern	—
Sulfite screenings	—
Sulfate screenings	—

Quotations on imported wood pulp, dollars per short air-dry ton on dock American Atlantic ports, follow:

Bleached sulfite Swedish, freight allowed	155.00—
Bleached sulfite, Norwegian, del'd with limited freight allowance	155.00—
Bleached sulfite, Finnish, freight allowed	155.00—
Unbleached sulfite, Swedish, freight allowed	135.00—
Unbleached sulfite, Finnish, freight allowed	135.00—
Kraft, unbleached, Swedish, freight allowed	125.00—
Kraft, unbleached, Finnish, freight allowed	125.00—
Kraft, bleached, Swedish, on dock	157.50—162.50
Kraft, bleached, Norwegian	155.00—

PAPER

Quotations are mill quotations Chicago

Boards (prices per ton, delivered in Chicago, 10 tons or more):	
Plain chip	107.50
News vat lined chip	110.00
.009 chip, rolls	100.00
Filled news	111.50
Solid news	114.50
White vat lined chip	144.50
Chip tube and can stock	112.50
Single manila lined chip	162.50
Single jute lined chip	147.50
Container, 42-lb.	
Kraft liner (per 1000 sq. ft.)	2.68
White patent coated	
.020	175.00
.018	177.50
.016	182.50

Book Paper (f.o.b. Chicago, c.l. cases per cwt):	
No. 1 enamels	20.55
No. 2 enamels	19.55
Machine-coated, 45- to 100-lb.	15.55— 19.00
60-lb. + uncoated offset, 25 × 38 (2000 lb.)	22.25
"A" grade English finish untrimmed, 25 × 38 (2000 lb.)	21.10
Rag Content Bond (white, 5000 to 10,000-lb. sub 20, ream sealed cartons):	per cwt
100% rag	—
75% "	—
50% "	—
25% "	—
Rag Content Ledger (white, 5000 to 10,000 lb., ream sealed cartons):	
100% rag	—
75% "	—
50% "	—
25% "	—
Sulfite Bond (white, 5000 to 10,000-lb. sub 20, ream sealed cartons):	
No. 1	—
No. 2	—
No. 4	—
Sulfite Ledger (white, 5000 to 10,000-lb., ream sealed cartons):	
No. 1	—
No. 2	—
No. 4	—

Newsprint (contract base price)	per ton
Rolls, standard	135.00
Sheets	Standard differentials

Kraft Wrapping — Natural (standard rolls 9- and 15-in. diam.)	per cwt
70-lb. and heavier	8.75
60-lb.	9.00
50-lb.	9.25
40-lb.	9.50
35-lb.	10.00
30-lb.	10.75
25-lb.	11.50
20-lb.	12.50
No. 1 Kraft Butcher — Pink	
	per cwt
40-lb. only	10.25
(Sheets — Plus 50c cwt)	

SAFETY NEWS

November Ends With a Five Per Cent Increase

FOR THE ELEVEN MONTHS ended November 30, 111 contestants reported perfect scores in the 1959 Paper Industry Safety Contest sponsored by the National Safety Council. The number of contestants registered in the competition is 508.

Last year's November record showed 106 perfect scores with a total of 676 registered contestants.

The January to November frequency rate for all divisions (except pulpwood logging) was 7.34, a 5-per cent increase from the same period in 1958. In the Pulp & Paper Division, the rate was 6.73, a 4-per cent increase from a year ago. In the Paper Converting, a rate of 8.64 meant an 8-per cent increase from last year. Pulpwood Logging reported a rate of 33.57, a 6-per cent decrease at the same time in 1958.

From the eligible mills in Division I, the board of judges will choose the mill with the most outstanding record. This plant will be awarded the grand prize—the Edward Benton Fritz Memorial Trophy—during the National Safety Congress in October. The trophy is presented each year by the Fritz Publications Inc., publisher of THE PAPER INDUSTRY.

Perfect scores recorded for the January-to-November period were as follows:

Division I — Pulp and Paper Mills

Group A

No perfect scores.

Group B

Consolidated Paper Corp. Ltd. (Laurentide Div.), Grand Mere, P. Q.

Group C

Kimberly Clark Corp., Fullerton, Calif.

Group D

Certain-Teed Products Corp., East St. Louis, Ill.; United States Gypsum Co., Oakmont, Pa.; United States Gypsum Co., Clark Township, N. J.; Crown Zellerbach Corp., Lebanon, Ore.; Crown Zellerbach Corp. (Gaylord Container Div.), Baltimore, Md.; Flintkote Co., Lockport, N. J.; Bestwall Gypsum Co., Pryor, Okla.

Group E

Johns-Manville Co. Ltd., Asbestos, Que.; Coos Bay Pulp Corp., Empire, Ore.; St. Regis Container Corp. (Muskingum Mill Div.), Coshocton, Ohio; Rogers Corp., Rogers, Conn.; U. S. Gypsum Co., Oakmont, Pa.; Flintkote Co., Little Ferry, N. J.; Continental Can Co. Inc. (Robert Gair Div.), Middleton, Ohio; Robertson Paper Box Co. Inc., Montville, Conn.

Spruce Falls Power & Paper Co. Ltd., Kapuskasing, Ont.; Crown Zellerbach Corp. (Gaylord Container Div.), Dresden, Ohio; Celotex Corp., Avery, Ohio; National Gypsum Co., Newburgh, N.Y.; Johns-Manville Corp., Tilton, N. H.; International Paper Co., Livermore Falls, Me.; International Paper Co., Riley, Me.; Container Corp. of America (Western Container Div.), Tacoma, Wash.

Division II — Paper Converting

Paper Bags

St. Regis Paper Co., Nazareth, Pa.; St. Regis Paper Co. Ltd., Vancouver, B.C.; St. Regis Paper Co., San Leandro, Calif.; St. Regis Paper Co., Playa Ponce, P. R.

Boxes and Cartons

Group A

General Foods Corp. (Carton & Container Div.), Battle Creek, Mich.; Crown Zellerbach Corp. (Gaylord Container Corp. Div.), Baltimore, Ohio; Consolidated Water Power & Paper Co., Wisconsin Rapids, Wis.

Group B

Dairypak Inc., Cleveland, Ohio; International Paper Co., Kansas City, Kan.; Pollock Paper Corp. (Folding Box Plant), Dallas, Texas; Crown Zellerbach Corp. (Gaylord Container Corp. Div.), Milwaukee, Wis.; Crown Zellerbach Corp. (Gaylord Container Corp. Div.), St. Louis, Mo.; Mengel Co., Winston Salem, No. Carolina; Wilson Paper Box Co. Inc., Richmond, Va.; Dairypak Inc., Athens, Ga.; Pollock Paper Corp. (Folding Box Plant), Dallas, Texas; Olin Mathieson Chemical Corp., West Monroe, La.; International Paper Co., Geneva, N. Y.

Crown Zellerbach Corp. (Gaylord Container Div.), Plymouth; International Paper Co. (Single Service Div.), Waco, Texas; International Paper Co. (Container Division), Mason; International Paper Co., Auburndale, Fla.; Fibreboard Paper Products Co., San Joaquin, Calif.; International Paper Co., Houston, Texas; International Paper Co. (Single Service Division), Turlock, Calif.; Fibreboard Paper Products Co., Denver, Colo.

Roofing Paper

United States Gypsum Co., South Gate, Calif.; Certain-Teed Products Corp., Dallas, Texas; Murray Brantford Roofing Co., Ont.; United States Gypsum Co., St. Paul; Celotex Corp., Cleveland, Ohio; Canadian Gypsum Co. Ltd., Mt. Dennis, Pl.; Ruberoid Co. Denver, Colo.; Fibreboard Paper Products Co., Portland, Ore.; Fibreboard Paper Products, Wilmington, Calif.; Johns-Manville Corp., Marrero, La.; Certain-Teed Products Corp., Tacoma, Wash.

Insulation and Building Board

National Gypsum Co., Mobile, Ala.; U. S. Gypsum Co., Lisbon Falls, Me.

Specialties

St. Regis Paper Co., Kalamazoo, Mich.; Kimberly Clark Corp., Appleton, Wis.; Kimberly Clark Corp., Winnipeg, Man.; Crown Zellerbach (Western Waxide Div.), Kansas City, Kansas; Pollock Paper Corp., Houston, Texas.

Division III — Pulpwood Logging

No perfect scores.

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he joined the company as general manager; his position as vice president and general manager has been held since 1945. Vandervort held important positions in the Fibreboard Manufacturers Assn. and was holder of several patents in the fiber box field.

A Symposium

(Continued from page 780)

tion and the degree of retention depended on the molecular weights and the configurations of the additives used.

In a survey, Dr. E. F. Thode, Chief of the Pulp and Paper making Section, Institute of Paper Chemistry, analyzed the experimental data of previous workers in his paper on **Rate Phenomena in Fiber-Resin-Water Systems.** He stated that stock preparation reactions, being heterogeneous, involve several of the following five classical steps: transport of the reactants from the bulk fluid phase to the interface, adsorption of the reactants at the cellulose-fluid interface, reactions at the cellulose surface, and desorption of byproducts (if these exist) and their outward diffusion. His analysis of the reaction mechanism was limited to the more important rate-controlling steps.

The last formal paper was that of Paul J. McLaughlin, Research Chemist of Rohm and Haas Co., Philadelphia, on the **Strength and Resilience of Polymer-Impregnated Paper: a Comparison of Saturants.** The effects of certain elastomeric and glass-like saturants on the mechanical properties of the paper sheet were gaged by studying the load-elongation curves. Non-functional acrylic ester polymers and butadiene-acrylonitrile polymers showed relatively good resilience. The addition of functional comonomers reduced resilience but increased strength. When molecular weights were reduced, resilience was improved but strength was reduced. All the usual soft saturants caused a reduction of the modulus of elasticity with regard to untreated papers. Some water-soluble high polymers increased the strength, post-yield slope of the elongation curve, and the resilience. He showed that the mode of addition of the polymer has a marked effect on sheet properties, and outlined the best type of polymer addition to obtain sheets with the optimum tensile and tear strength. What conditions should be used in the case of beater additions were also discussed.

During each of the three days of the symposium, the registrants met for luncheon at the Riverview Country club, and at the final meeting there, Mr. John G. Strange president of the Institute of Paper Chemistry spoke of the importance of scientific research. At present, our intensified concern with scientific research might be due in large measure to the threat to our national security. However, when this was no longer the case, political pressures may be replaced by social and economic pressures and these in turn would be followed by a growing acceptance of the ethic of dynamic conservation. The latter could be one of the great motivating factors among scientists of the future.

The symposium closed with a panel discussion and summary under the chairmanship of John W. Swanson, head of the Physical Chemistry Department of the Institute of Paper Chemistry.

PAPER INDUSTRY

Whither?

... in production, processes, new products, markets

Hot melt extrusion technique used to seal new shipping bags

A new padded shipping bag introduced by Jiffy Mfg. Co. is produced using a specially tailored extrusion system, which applies the adhesive to the bag seams, and a new type granular hot melt adhesive called "Instant-Lok".

The new method permits substantial savings as a result of increased production speed, while the use of the instantly setting hot melt adhesive has made it possible to reduce the size of the back-seam lap from 1 in. to ½ in.

Pulp-fertilizer and grass seed slurry used in soil stabilization

Using a slurry consisting of a specially prepared wood pulp, fertilizer, grass seed, and other additives, International Paper Co. has successfully demonstrated the seeding of grass on steep embankments and levees.

The slurry is blown over the bare ground in a single application. It dries quickly to form a papier-mache-like blanket which encourages seed germination and provides protection from erosion.

The equipment consists of a 1,500-gal. slurry tank, a 150-gpm pumping unit, and a modified Rotomist blower manufactured by the John Bean Division of the Food Machinery & Chemical Corp.

Urethane foams for insulation

Sprayable urethane foams developed by Wyandotte Chemicals may find a wide application for insulation of process equipment, pipes, tanks, etc. The self-adhering foam can be sprayed on both smooth and irregular surfaces. It dries in five minutes after its application, has a thermal conductivity of 0.14 (for a 2-lb-per-cubic-ft. foam) compared to 0.2 for conventional insulation such as glass fibers, cork, etc., and is resistant to weathering and chemical attack.

Wheat flour for paper coatings and sizes

Wheat flour treated with ethylene oxide or propylene oxide, to produce hydroxyethylated or hydroxypropylated flours respectively, has been found to be useful as a thickening agent, adhesive, coating and size for paper and textiles, as reported by USDA's Northern Utilization Research and Development Division.

Pulpwood measured by immersion in water

A new pulpwood measuring technique has been developed by a Finnish mill whereby bundles of pulpwood are immersed in a basin of water. The volume of dispersed water is then read directly on a graduated glass gauge.

A winch driven by a 4 KW electric motor and two cables are used to drag the pulpwood bundle completely under water.

Wood chips transported in plastic containers

Trials are being made on the West Coast to transport pulpwood chips in plastic bags or in 8-ft.-dia., rigid plastic spheres. Should these experiments prove successful, strings of plastic bags filled with chips may soon become a familiar sight on rivers serving major logging areas.

an Invitation to PAPER COATERS

to explore the possible advantages, both physical and economic, of using animal bone glue as the adhesive in paper coating

ANIMAL GLUE, once used as the adhesive in paper coatings, is back in the picture. Improved glue qualities and new coating formulations have shown definite advantages—substantiated by laboratory evaluation, a full-scale paper mill trial, and actual printing tests.

For a more detailed announcement of this development (printed on glue-coated paper), a technical bulletin describing the method used, or samples of DARLING's coating grade glue, write:

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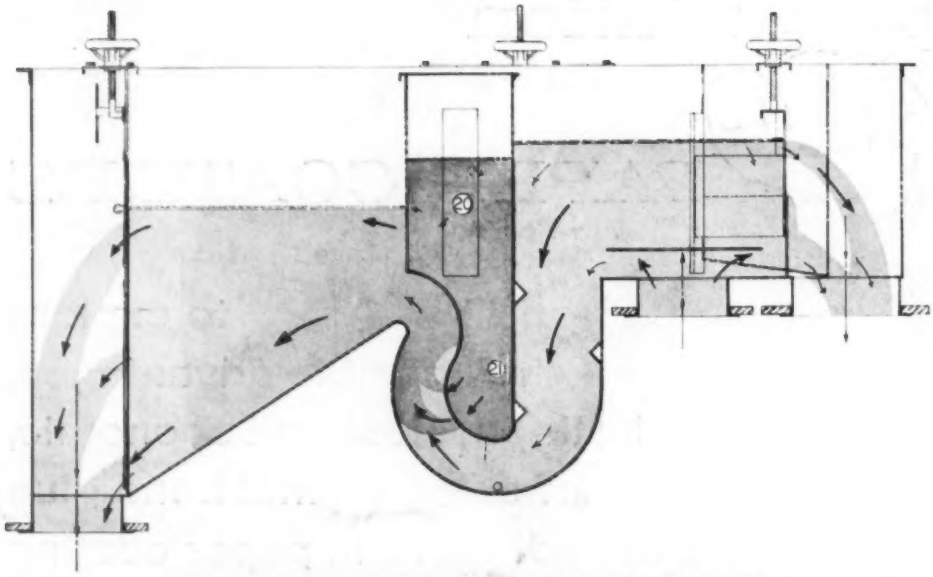

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* This means incoming consistency can fall below control setting yet the regulator will automatically PUT ON STOCK TO MAINTAIN BASIS WEIGHT.
* MORE yardage per run because of uniform basis weight. Machine chest can be worked off practically down to the last drop at end of run.
* MAINTENANCE FREE OPERATION — NO MOVING PARTS.
* Consistency controlled to within 0.1% through use of the Poirier Equilibrium Patent. (Provides instantaneous, precise correction of stock being discharged).
* On start-ups - and in duplicating previous runs - stuff gate setting is pre-set to provide immediate on weight operation.
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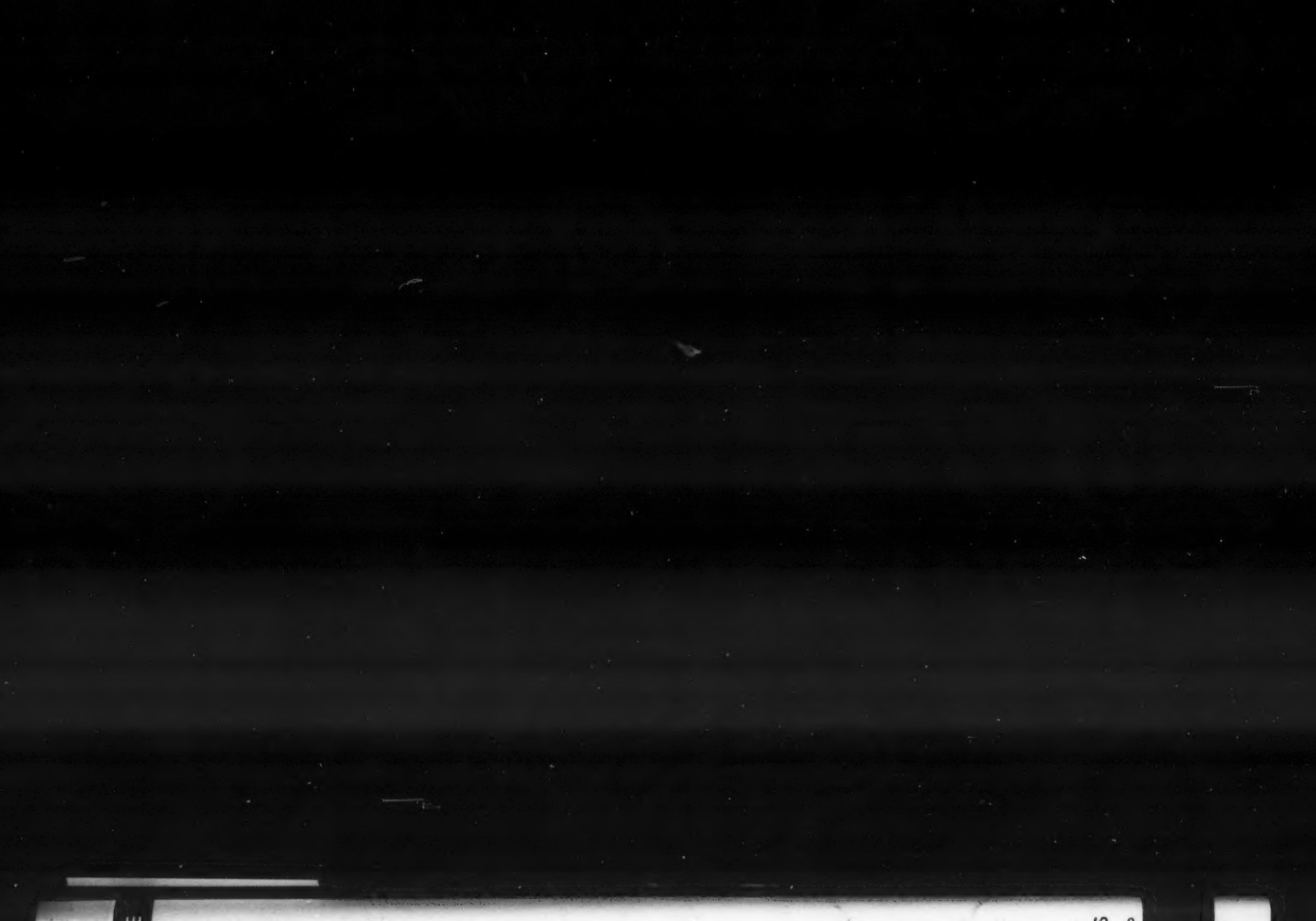
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